41 p/s.

THE

# Civil Architecture of Vitruvius.

COMPRISING

THOSE BOOKS OF THE AUTHOR WHICH RELATE

TO THE

## Public and Private Edifices of the Ancients.

TRANSLATED BY

WILLIAM WILKINS, M.A. F.A.S.

LATE FELLOW OF GONVILLE AND CAIUS COLLEGE, CAMBRIDGE; AUTHOR OF THE "ANTIQUITIES OF MAGNA GRAECIA."

ILLUSTRATED BY NUMEROUS ENGRAVINGS.

WITH

## An Introduction,

CONTAINING

AN HISTORICAL VIEW OF THE RISE AND PROGRESS OF ARCHITECTURE AMONGST THE GREEKS.

*LONDON:*

PRINTED BY THOMAS DAVISON, WHITEFRIARS.

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1812.

TO

# GEORGE, EARL OF ABERDEEN, K.T.

F.R.S. P.S.A.

VISCOUNT FOMARTINE,

LORD HADDO, METHLIC, TARVAS AND KELLIE,

&c. &c. &c.

MY LORD,

The science of Architecture has not been deemed unworthy of cultivation by the greatest statesmen in the most civilized nations of antiquity.

Athens, in her progress towards the most exalted stage of her brilliant career, produced, under the direction of Pericles, monuments which, as they have never been equalled, may be justly considered as affording to the followers of the science unerring principles for their guidance.

A desire to tread in the footsteps of him, whose exertions succeeded in obtaining for the arts of his country a pre-eminence acknowledged by surrounding nations, has been an inducement with your Lordship to devote that attention to the study of Architecture which has tended to ennoble the science: and an admiration of the works produced under the auspices of that great man, has directed your steps to those sources of information as yet but imperfectly explored.

In seeking to obtain protection for a work on the science of Architecture, to whom could I look up with such assurance of success as to you who have contemplated the noblest remains of the art, in the country which fostered it and brought it to perfection, and whose knowledge and taste are justly admitted?

A high veneration for your character, to which a long acquaintance has given birth, is an additional motive with me to solicit for my production that honorable distinction which your patronage must necessarily confer.

I have the honor to subscribe myself,

Your Lordship's

most faithful

and devoted servant,

WILLIAM WILKINS.

*New Cavendish-Street, Portland-Place,*

*December* 31, 1812.

# ADVERTISEMENT.

IN offering to the world a translation of an author so well known as Vitruvius some apology seems necessary; more especially when it is considered that besides the various editions, we have already a translation in our own tongue and others into those languages which, in the present state of society, are considered essential in any system of general education.

The first editors of Vitruvius, accustomed to the contemplation of the remains of Roman architecture, and wholly ignorant of the existence of any early specimens of Grecian taste, have searched for illustrations of their author amongst the edifices of Rome; expecting, with some appearance of probability, that the principles he promulgates would be found to prevail in the buildings of the country which gave him birth. Engaged in this task, they seem to have disregarded his uniform assertions, that, upon the architectural monuments of Greece, or rather the writings descriptive of them, the basis of his work was formed. Had these assurances availed, instead of adopting in their editions variations from the text of the manuscripts, which the discrepancy between the principles upon which the edifices of Rome were constructed, and those detailed by Vitruvius, seemed to authorize, they would have sought for that coincidence in the remains of Grecian architecture which was not to be discovered amongst the vestiges of the art in Italy.

When it is remembered that Vitruvius is the only ancient writer upon the science of architecture whose works have reached our times, an enquiry into the authority for admitting the various readings and interpolations may not be thought uninteresting: because, if that authority should be deemed insufficient, and it be made to appear that the reading of the manuscripts is compatible with his avowed practice of seeking amongst the edifices of Greece for the principles he disseminates, the ancient readings may, in many instances, be restored, and the text in some degree purified from the corruptions with which the early editors have loaded it. Former translators, in following the text of the printed editions, have propagated these errors, which, in many instances, are wholly subversive of the principles of architecture our author intended to inculcate.

An acquaintance with the remains of ancient art in Greece and in Ionia, obtained by studying upon the spot the principles of their construction, has been the chief inducement with the author of the following translation to devote his leisure to the examination of those books of Vitruvius, in the illustration of which such a knowledge is not only particularly applicable but essentially necessary. It is obvious that the objections to the various readings apply almost exclusively to those parts of the author which relate to the civil architecture of the ancients; for which reason these alone have been selected for examination.

Many of the architectural terms used by Vitruvius are incapable of being expressed in corresponding words without much circumlocution; on which account it was thought adviseable to retain the original terms, and to give their signification in a vocabulary at the end of the work. It was likewise deemed expedient to preserve the orthography of the Greek words, which are found scattered throughout the books of Vitruvius, merely using Italic characters to distinguish them.

For the sake of greater perspicuity, the translation is first given according to the text of the manuscripts, accompanied by notes explanatory of the reasons for retaining such parts of it as have been altered in the printed copies. The illustrations of the text and explanations of the plates are given at the end of the several sections. The division into sections corresponds with that used in the books of the manuscripts; the order of the enumeration is the same, but the mode is different, the first section answering to the third book of the author.

The introduction is selected from materials for a much more extensive work, which the author has wanted leisure to arrange and complete.

## ERRATA.

| | | | | |
|---|---|---|---|---|
| Page 3 | Line 12 | for, *analogy*, | read, | *analogia*. |
| 5 | 25 | *monads*, | | *monades*. |
| 27 | 24 | to, | | and. |
| 46 | 11 | parallel, | | a parallel. |
| 70 | 8 | a triglyph, | | the triglyph. |
| 70 | 18 | | | |
| 71 | 2 | coronae, | | corona. |
| 72 | 10 | | | |
| 73 | 13 | follow, | | follows. |
| 81 | 7 | coronae, | | corona. |
| 97 | 9 | Olympiusa t, | | Olympius at. |
| 101 | 17 | trabs, | | trabes. |
| 104 | 1 | Tios, | | Teos. |
| 215 | 17 | rest, | | rests. |
| 217 | 5 | *Cyziceni*, | | *Cyzicenoi*. |
| 222 | 29 | palestra, | | palaestra. |
| 230 | 15 | tridinia, | | triclinia. |
| 281 | 22 | so placed, | | two so placed. |

# INTRODUCTION.

All nations, in an advanced state of civilization, have been unanimous in their admiration of Grecian architecture; it presents, therefore, a subject of interesting inquiry to endeavour to ascertain whether this sentiment of admiration be excited in us by any qualities or properties peculiar to the style itself, operating previously to the intervention of the judgement; or whether it be not the effect of intellectual association only. By intellectual association I mean the union of such ideas as the imagination has originally presented to the mind, and of such as the understanding has finally combined, after having compared them with each other. This species of association is, consequently, never to be confounded with that which may be called sensible association, by which ideas, in childhood always, and often at a more advanced age, are admitted without scrutiny, and combined without reflection. If, then, admiration of Grecian architecture result from intellectual association, it will be found to exist only among men of knowledge; and its just proportion will be determined by those whose taste is the most cultivated, and whose science is the most extensive: but if there be some intrinsic charm, some peculiar grace, which is necessarily acknowledged and felt by all mankind; we then must look for some more general principle, which will accommodate itself to this more general feeling.

It seems impossible that we should contemplate any remains of Grecian taste and science, of whatever description they may be, without, at the same time, adverting to other monuments of other arts, and connecting them in the mind with those which are immediately before us. In vain would we believe that we admire them as if they stood insulated and alone, while association is softening every defect, and enhancing every beauty,—while memory is retracing the most affecting scenes,—or while fancy is grouping the most interesting objects. We can scarcely deny, then, that the pleasure which is derived from surveying the ancient models of Grecian architecture is heightened by ideas connected with learning, with science, and with art; accompanied, as they still must be, by all the nameless charms which imagination combines with the history of the Greeks, and which it throws over all their productions. It is probable, nevertheless, that their buildings possess certain qualities which affect us independently of all these associations, and which, even without them, fail not to produce sentiments of admiration, and feelings of delight.

In speculating on the nature of beauty, too much appears to have been attempted. Dissatisfied with looking merely to peculiar results arising from certain combinations of qualities, or fatigued, perhaps, by the minuteness of details, we have gone on abstracting, in the hopes of discovering some general principles, to which every species of beauty may be referred, and some comprehensive rules, according to which every example of it may be classed; although it is highly probable that these hidden properties will continue to elude the test of the strictest analysis. It has been this desire of generalizing which has led Mr. Burke, and those who have followed him, to adopt notions contrary to the plainest dictates of reason and philosophy. To the art now under consideration, the principles employed by this great man either are not applicable at all, or they are so in a very slight degree. It is not, however, to their truth and accuracy in a limited sense, but to their universal and exclusive adoption, that we ought to object. According to Mr. Burke[1], the essential requisites for the formation of the beautiful are, "*first*, to be comparatively small; *secondly*, to be smooth; "*thirdly*, to have a variety in the direction of the parts; but, "*fourthly*, to have those parts not angular, but melted, as it "were, into each other; *fifthly*, to be of a delicate frame, "without any remarkable appearance of strength; *sixthly*, "to have its colours clear and bright, but not very strong and "glaring; *seventhly*, or if it should have any glaring colour, "to have it diversified with others." One moment's reflection on this statement suffices to shew that these qualities, so far from being essential to architectural beauty, are really in some measure of an opposite description. Let us take as an example the most beautiful perhaps of the buildings of antiquity, raised and adorned by the most celebrated artists, and the whole finished under the inspection of the most

[1] Subl. and Beaut. Pt. iii. Sect. 18.

accomplished statesman of Greece,—the temple of the Parthenon, at Athens. We shall find, that although it is less than some few structures of the same description, it is impossible that it should ever, with propriety, be characterized as comparatively small,—that it possesses no delicacy of frame, but that the appearance of strength is such as becomes the style in which it is built, and plainly denotes the permanence of its duration,—that the direction of the parts is necessarily uniform, and the greater proportion of these, sharp and angular,—that the colour, although now somewhat softened by the effects of time and weather, was formerly the most bright and glaring which it is possible to imagine, viz. the dazzling whiteness of the marble of Pentelicus, no otherwise diversified than by the lights and shadows produced by the various masses which composed the whole edifice.

Smoothness in this as in other buildings is indeed pleasing, but from a cause different from that which is assigned by Mr. Burke in his Essay on the Sublime and Beautiful; for the pleasure that we have in surveying the polished exterior of a building, arises entirely from the ideas which it gives us of the care and skill with which the work has been finished. The smoothness which is observable in any finely-laboured structure may certainly impart an agreeable sensation; but it is different from that which is experienced in looking at the blue expanse of the Heavens softly laid on the smooth surface of a lake. It is yet more different from that which is felt when the eye regards the smooth and delicate skin of a beautiful female. When we admire smoothness in a building, we admire it as an effect, which we naturally associate with the causes that have produced it. In this instance, the secondary quality, considered separately and in itself, produces no sentiment of pleasure; it is agreeable, only as it is the result of skill and art. This is evident from our equal admiration of those parts of architecture which are covered with a profusion of minute and elaborate ornament, the general effect of which is an appearance only of roughness, and whose forms, when viewed in detail, being sharp and angular, cannot impart an agreeable sensation by any organic affection of the eye itself.

It must be evident, I think, that the properties and qualities considered by Mr. Burke as essential to every species of beauty, have been principally, if not entirely, collected from the female form. Now, although they are here connected with all that is most lovely, yet the real source of their attractions appears to have been overlooked, and this is probably to be discovered in the sexual affections and sympathies implanted in our nature. Had it, therefore, been practicable by classing the charms of the most beautiful work of the creation, to invest in these charms every other object, the choice would have been judicious; we might even have desired the success of such an enterprise; and yet, according to the present order of things, it would seem a little whimsical to maintain, that feminine graces, feminine delicacy, and feminine proportions, ought to constitute beauty in a tree or a house. The rules which Mr. Burke has laid down may be found to be just when applied to the female form, but to extend them to every form in nature seems little less unreasonable than if we were to assert, that every species of composition ought to be framed according to the decrees which the critics have promulgated for the perfection of the drama,—decrees, which are in themselves sufficiently tyrannical, and which, unlike the rules of Mr. Burke, are formed from the analysis of a most imperfect model.

Not satisfied with having triumphantly refuted the notions of those theorists who maintained that fitness and proportion are the sole causes of beauty, Mr. Burke has gone so far as to deny that these qualities are in any way necessary to its existence. This opinion, as far as it regards architecture, is erroneous :—for, although there undeniably exists a real distinction between the ideas of beauty and of fitness to an end, yet in a scientific art, of which utility is the chief object, the full perception of excellence requires some effort of the understanding, and depends, in great measure, on our finding that the means employed are justly calculated for the attainment of what we know to have been the ends proposed : here, therefore, proportion and fitness are indispensable to the sensation of beauty. Certain striking and remarkable qualities, it is true, may, independently of these considerations, affect all minds alike ; but this arises not from their beauty, nor their proportion and fitness, but from the vague and indistinct ideas which those qualities suggest of the superior power and energy requisite for their production. All such qualities, indeed, as tend to create ideas of that superior energy and power by which an elevation and expansion of mind are occasioned, may be stated as the real causes of grandeur and sublimity in architecture. Of these, magnitude is the principal, and perhaps only, quality which is indispensable: but its effect may be much heightened by the solidity of the materials which compose the mass; for this verifies and strengthens the first impression of the whole, and, in addition to the sense of original difficulty overcome, gives an appearance of eternal stability to the building. Hence, we cannot fail to be struck with the grandeur of the Egyptian pyramids, from their solidity and their vast extent, although the pyramidal form is not in itself peculiarly imposing, as is proved by the mean character of that of Caius Sestius at Rome, and of all others of small dimensions.

It is not, however, only in uniform and simple structures, that the qualities, which I have mentioned, are productive of the sublime in architecture. A great profusion of ornament is far from being incompatible with a similar result. A Gothic cathedral, with its lofty and slender proportions, and endless variety of parts,—or a Grecian edifice with all its decorated regularity and order, will produce similar sensations of wonder and admiration. Thus, although no objects can differ more both in their general character and in their details than the great pyramid, York minster, and St. Peter's church, yet, as each possesses the efficient cause of grandeur, each excites those feelings which partake of sublimity.

Mr. Burke observes, that uniformity and succession of parts, as the great causes of the artificial infinite, tend mainly in architecture to produce sublimity; and thinks, that the effect of a colonnade may be chosen with propriety to exemplify the truth of his position[1]. Doubtless the portico

[1] Subl. and Beaut. Pt. ii. Sect. 9.

at Palmyra, which was two thousand feet in circuit, or the peristyle of the great temple at Selinus, which was sixty feet in height, must have been eminently grand and imposing; but it is not true, that the mere collocation of parts, without any reference to the magnitude of their dimensions, can ever prove a source of the sublime. In these instances, as in all others, its true origin will be found in that quality which most powerfully excites ideas of the superior force and energy necessary for the accomplishment of the work.

Architectural beauty may be said to arise from the symmetrical proportion of the whole building, and from the fitness and propriety of the ornamental parts. This will sufficiently accord with the definition of the beautiful as given by Aristotle, which consists, according to him, in magnitude and order; the first being a term purely relative, is made to comprise the whole extent of that scale which the eye is able to embrace at one view[1]. The truth is, however, that general rules for beauty in this or in any other practical art, cannot be fixed from abstract conclusions; but must be deduced from experience and the continued observation of those qualities which have been found universally to please: and by an adherence to this principle the Greeks seem in a great degree to have regulated their practice. Hence, the remarkable uniformity of all their buildings, in which, indeed, the variations are so slight as scarcely, on a first view, to satisfy the natural desire of novelty, or justly to merit the praise of invention. A quadrilateral form, adorned with exterior columns, in different

[1] τὸ γὰρ καλὸν, ἐν μεγέθει καὶ τάξει ἐστί. Poet. P. ii. S. 4.

degrees of magnificence and profusion, constituted almost invariably the figure of their most splendid edifices. But, although generally similar in plan, distinct varieties are observable in Grecian structures; each peculiar and consistent in all its respective parts. The character of massive and imposing grandeur in the Doric style,—of adorned yet simple majesty in the Ionic,—and of festive sumptuousness in the Corinthian, is preserved throughout the minutest details of these orders. If any one deny that a sense of fitness and propriety in architecture be a source of pleasure, he has only to bring together some of the more prominent parts of these different modes of building, in order to be convinced of the incongruity that would result from their union. This incongruity, although invariably revolting to the eye of taste, is, in fact, perhaps only apparent; for there is nothing in the nature of the members themselves which, when joined, should render them really unfit for the purposes of strength and utility; but from the long observation of a contrary practice, recommended by so many powerful associations, we have become impressed with this notion, which it is now impossible to eradicate. Having constantly witnessed the employment of columns, and other ornaments under similar circumstances of apparent fitness, we are shocked at any material deviation from established usage. Hence, that which is commonly called a skreen, or a row of columns supporting nothing but their own entablature, fails not to create an unpleasant sensation; because however beautifully the parts may be executed, the mind remains ignorant of the destination, and dissatisfied with the propriety of the whole; which indeed can scarcely suggest any other idea than that of a ruin, or of some unfinished building.

Architectural ornament, if not really useful, ought in its principal parts to wear some semblance of utility; there should exist, at least in appearance, a sufficient reason for its introduction, although, in truth, perhaps, there may be none. We have frequently seen holes, or recesses, made in walls for no other purpose but that of containing columns, and it is not uncommon to find little projections formed by sticking a couple of columns, with their entablature, at intervals along the plain surface of a building. Decoration of this kind is always offensive, because it is at once discovered to originate in an ostentatious desire of splendour; producing infallibly, however, the effect only of tawdry and misplaced finery.

With respect to columns, perhaps their great charm, in addition to the apparent fitness of their employment, consists, by the power of lights and shadows, in the production of a species of intricacy, and in a concealment of parts, which, although really indistinct, the imagination can with certainty fill up and supply to itself. Indeed, the variety of surface necessary to occasion this result, and the preservation, at the same time, of the general harmony and proportion of the edifice, may be said to form the main object of ornamental architecture. The perfection of ornament, as taught by those examples which educated men have in all ages agreed to admire, and by which criterion alone it is to be estimated, is natural and consistent: it is fixed in that happy medium which alike avoids the poverty that is caused by the extreme of simplicity, or baldness, and the confusion that arises from redundancy and caprice. If we seek for the manifestation of pure taste in the monuments that surround us, our search will but too often prove fruitless. We must turn our eyes towards those regions,

> Where, on the Egean shore, a city stands,
> Built nobly!

Here,—it has been little understood, for it has been rarely felt; its country is Greece,—its throne, the acropolis of Athens.

It has been observed, in a work replete with learning, ingenuity and good sense, that as the ancient buildings remaining to our time are almost exclusively of a religious description, and which, having been situated in streets and squares, possess all the regularity of form desirable in city architecture; and, consequently, that the effect intended to be produced is such only as may be compatible with their circumscribed and contracted position—it therefore becomes doubtful, how far we can with propriety adopt them as our guides in the embellishment of rural scenery[1]. In all this there appears to be some mistake; for even in towns the temples were conspicuously placed on the most lofty and commanding eminencies: and in Greek towns it is well known these are generally to be found; but many of the most beautiful were entirely removed from the habitations of men. The temple of Minerva to be seen on the promontory

[1] Knight, Analyt. Inquir. Pt. ii. ch. 2.

of Sunium, that of Jupiter on mount Panhellenius in Aegina, and of Apollo on mount Cotylus in Arcadia, built by the most celebrated architect of Greece, and still standing in the depth of the same forest, and amidst the descendants of those oaks by which it was anciently surrounded, are a few among the numberless examples sufficient to attest the prevalence of the practice in the best ages of the art. It has likewise been remarked[1], that the villas and country-houses of the ancients were quite irregular in appearance, and adapted to local circumstances; and, therefore, had they still existed, would have furnished more just notions for the construction of our own mansions. This too, as far as we can learn, is erroneous. The enormous extent of the villa of the emperor Hadrian, as well as of those of other princes, must, undoubtedly, have comprised every variety in form and situation; bearing, in fact, more resemblance to cities than to individual dwellings; but there is no reason to imagine that the generality of their country residences were not in their exterior perfectly simple and regular. On the contrary, it is evident from the minute descriptions of Vitruvius, that they consisted of bare walls, without any architectural ornament[2], every thing of this kind being lavished on the interior fronts which looked towards the inclosed courts[3]. The villa of Pliny which appears to have been of considerable

[1] Knight, Anal. Inq. Pt. ii. sect. 38.

[2] The town houses of the Romans very rarely boasted of exterior architectural decoration; in all common cases such a display appears to have been forbidden. Julius Caesar obtained a decree of the senate which empowered him to adorn his house like the front of a temple, and to add a fastigium, or pediment, to it. Cic. Phil. ii. 43.

[3] Vitruv. lib. vi. c. 3. 10.

extent and magnificence, and which is described with all the detail naturally to be expected from the partiality of a proprietor, presents none of this irregularity; or if by any ingenuity of interpretation, something of the kind may be conjectured to have existed, it must have been purely accidental, and only produced in consequence of the necessary arrangement of the interior apartments, without the least reference to any general or preconceived design[1]. These buildings, therefore, cannot reasonably be supposed competent to afford us any correct views of picturesque effect in their composition with natural scenery; and the fact is, that the ancients never possessed any knowledge or perception of those qualities of external objects which are called picturesque. It is not intended by these remarks to prescribe the exclusive or servile imitation of any particular species of the remains of antiquity, but merely to recommend an adherence to those general principles of excellence on which the Greeks worked, and which are observable in all their undertakings in this art, whether erected for the purposes of ornament or of utility. Still less can these observations have any tendency to depreciate a style of architecture, the principles of which have recently been laid down with singular feeling and accuracy of taste[2]; —a style, which aims chiefly at picturesque effect, which seeks to harmonise and connect the building with the landscape around it, and in which the eye of a painter is, perhaps, not less indispensable than the science of the architect;—which is recommended not only by the intricacy

[1] Plin. Ep. lib. xi. 17.

[2] Price. Essay on Architecture and Buildings as connected with Scenery.

and variety of its parts, but, if the expression may be permitted, by an union with the vegetable world, arising either from the skilful grouping of trees and shrubs, the luxuriant growth of creeping plants, or the blended tints of mosses, lichens, and other parasitic vegetation. To a style founded on these principles, it is evident that all precepts derived from the simple and regular structures of Greece must be perfectly inapplicable.

It appears somewhat extraordinary, and is certainly to be lamented, that the Greeks, who carried the practice of so many sciences and arts to a degree of perfection which has since been unattainable, should have been so little solicitous to examine the causes of their rise amongst them, or with any care to trace their progress. Contented with the idle fables handed down from early times, and repeated with additions and embellishments acquired from the imagination or garrulity of succeeding narrators, their real knowledge of the origin of those objects which excited their pride and admiration, appears to have been vague and unsatisfactory. Even the gradual changes of their language, until a comparatively late period, occupied but little of their attention: and their national history itself, in its early ages, if we except, perhaps, the first book of Thucydides, received no illustration from the exertions of rational criticism and philosophical enquiry.

We may safely conclude, that the history of their architecture was left pretty much in the same state, for, although no Greek writer on this subject has been preserved to our time, it is probable that their compositions, in addition to the tales generally propagated, were confined chiefly to practical instructions, or scientific refinements. Vitruvius not only professes to follow the steps of the Greeks in treating of his art, but all the authors whom he describes as the sources from which he derived his skill and knowledge are selected from among that nation. The work, therefore, of the Roman may furnish a just criterion of their labours. This treatise, full of varied learning, remarkable for ingenuity, science, and acuteness, will not, however, afford any succinct view of the progress of architecture. A multitude of uncertain traditions are collected and detailed without being submitted to any test by which their fallacy may be detected: we are bewildered by the opposition of opinions and statements, equally positive and contradictory. But while we are careful not to pay to these authorities the respect due to historical truth, they ought in an enquiry into this subject by no means to be cast aside; such as it is, they form the chief body of the information we possess: and they become doubly valuable when their internal probability is corroborated by illustrations incidentally afforded by contemporary writers, or by the known peculiarities of ancient monuments.

Vitruvius, although the age in which he flourished is a subject of dispute, appears to have lived about the reign of Augustus. His reputation, early established, is so far from having suffered by the lapse of time, that the admiration of posterity has rendered his name almost synonimous with excellence in his art. His own professions teach us to expect that his leading principles and precepts will be conformable to the practice of the Greeks; and, although nothing has hitherto been done in order to shew how far this expectation has been fulfilled, I believe, nevertheless, that it waits only the result of an exact and minute inquiry to be fully realised.

Vitruvius brought to the composition of his work the possession of much of the learning of that period; so much indeed, as probably to embrace the extensive range of acquirements which he has himself laid down as necessary for the architect. To this he added a mind replete with notions in a high degree fanciful and visionary, and influenced by a strong bias to metaphysical distinction and refinement. Hence arose the laboured dissertations on the unintelligible connection of architecture and music, and the institution of that scale of harmonic proportions which has exercised the ingenuity of the learned, to so little purpose, down to the present day[1]. Hence too arose his perception of the analogy which he supposed to exist between the members of architecture and those of the human frame; a notion which he has pursued to a great extent. It was this imaginary resemblance which induced one of the greatest artists of modern times still further to declare, that even a knowledge of anatomy was so indispensable to an architect, that without it he must necessarily be ignorant of his profession[2]. How

[1] Galiani, in a note to his translation of Vitruvius, considers the deficiency of musical knowledge as the cause of the inferiority of modern architecture. Lib. ii. c. 1.

[2] Michael Angelo, Lett. 17.

— e però è cosa certa, che le membra dell' architettura dipendono dalle membra dell' uomo. Chi non è stato, o non è buon maestro di figure, e massime di notomia, non se ne puo intendere.

this knowledge, which he certainly possessed in a high degree, influenced his own practice as an architect is not very apparent; but by an affected and ostentatious display of anatomical science as a sculptor, he has much detracted from the beauty and grandeur of some of his most admirable works. But these are dreams; or, at best, speculations of the most groundless and fallacious description.

In presenting a view of the progress of architecture among the Greeks, it is not my intention to dwell on the history of its origin, or to speculate at length on the probable means resorted to by a barbarous people in order to protect themselves from the severity of the weather. It must be evident, that among all nations an imperious necessity has been the parent of their first endeavours, and that whatever mode they may have adopted, must have been entirely determined by the nature of the materials of which they were in possession. It is probable that in their subsequent advances in the art these early attempts were not wholly forgotten, and that something of their original character was insensibly imparted to all the improvements of succeeding ages. Thus, we find the dark and ponderous buildings of the Egyptians resembling, in some degree, the rocky caverns to which, in a country destitute of wood, their troglodite ancestors had recourse[1]. The ornamental architecture of Greece, in its most essential parts, bore a striking testimony to the early use of that timber with which the country abounded. In India we discover the primitive employment of reeds and bamboo, in the lofty and slender

[1] Diodor. Sicul. lib. i. c. 45.

buildings of later times: and in China there is scarcely an edifice, the roof of which is not constructed in imitation of the moveable tents of their Tartarian forefathers.

Architecture, from the period of its invention, in its progress to perfection must have experienced those gradations to which every art is necessarily subject: for, however this progress may have been retarded or facilitated by the intervention of temporary and accidental causes, we shall not fail to perceive the successive changes from rudeness to simplicity, from grandeur to magnificence. As an ornamental science, it may naturally be expected to keep pace with the advances made in those arts to which it is nearly allied, an improved culture of each depending mainly on the same vigour of imagination and general refinement of taste. In Greece, therefore, that powerful cause, or combination of causes, which so early produced by the operations of genius such a magical effect on the arts of design, exerted a similar influence on the state of architecture, and if this were the place to prosecute the inquiry, a most remarkable correspondence might be traced in the respective conditions of these various arts throughout the whole history of that wonderful people.

On the rude endeavours of savages in the construction of their primaeval huts Vitruvius has sufficiently dwelt. But on the more interesting question of the obligations imposed on the architecture of Greece, by the previously established practice of Egypt, he is silent; and not only neglects to inquire into this point, but appears to avoid all mention of the buildings of the latter country. However forcibly the different character assumed by Grecian art may incline us to doubt its Egyptian origin, it will be difficult to resist the unanimous voice of antiquity on this subject; for we shall scarcely find a district of Greece without its tradition of foreign adventurers, bringing to the coasts an improved state of knowledge and civilization; and whether these personages are to be traced directly to Egypt, or rather to Syria, is immaterial, as in that age the two countries were nearly identified[1]. The vanity of some nations may, perhaps, receive gratification from the fabled intercourse of their ancestors with foreign heroes, and their own descent from such a source. The expedition of Aeneas, and even the settlement of the Trojan Brutus might be pleasing to their self-created posterity; but the proud feelings of the *earth-born* Athenians could never have been flattered by the invention of a tale which confessed their rescue from the rudest state of barbarism by an unknown Egyptian, whose only claim to notice is in his capacity of their legislator. A confirmation of the prior advances made in the arts of design by the inhabitants of the coast of Syria and of Egypt is afforded by the conclusive testimony of Homer, from whose expressions the wealth and magnificence of the Egyptians are apparent, and with whom it is a sufficient commendation of any object of beauty and elegance that it should be called Sidonian. The distinctive appellation which he has given to this people, is that of 'skilful workmen[2].' It is true, that with the Greeks the arts soon

[1] See some conclusive observations on this subject. Mitford's Hist. of Gr. v. 1. It must however be admitted that the silence of Homer tends, in some degree, to invalidate the notion of Egyptian colonization.

[2] Σιδόνες πολυδαίδαλοι. Il. xxiii. 744. et pass.

lost the character impressed on them by their first teachers: their sculpture, at a very early period, far from bearing any resemblance to the timid and lifeless productions of the Egyptian artists, was carried to the opposite extreme; all is energy, and spirit and nature are in a manner burlesqued by distorted action and violent gesticulation. This entire change was owing to the same active and enterprising mind, which had enabled them still more rapidly to advance their poetry to perfection, and which arose probably from the general freedom of their governments, and the constant communication between numerous independent states. Yet, even in Greece, there was a time in which sculpture unquestionably partook of that stiff columnar style, which, from the remotest antiquity, prevailed on the banks of the Nile, unimproved and unchanged by succeeding ages. The Daedalean statues, notwithstanding the exaggeration of ancient writers, appear to have been of this kind, and the existing descriptions of the earliest representations of the deities, with the imitations of these works still remaining to our times, place the resemblance beyond all doubt. Architecture too, although it quickly ceased to be solely employed in the erection of operose and tasteless fabrics, and became in the hands of the Greeks distinguished for propriety, elegance, and grandeur, may yet be said to have been, in some measure, indebted to the practical endeavours of this contemptible people.

In thus mentioning the obligations of Grecian architecture to the practice of Egypt, the statement must be understood as limited to the mere mechanism of the art, and not as intended in any degree to detract from the just claims of the Greeks to originality. If, indeed, the discovery of all that is admirable, of all in which its beauty and attractions consist, can sanction such a claim, we may safely place this art among those which they most distinguished by the fertility of their invention, as well as by the unparalleled beauties of their execution.

In treating of a period far removed from the approach of regular history, it is fortunate that we are furnished with so unerring a guide as Homer; whose general accuracy of observation and minuteness of description are such, as to afford a copious source of information respecting almost every thing connected with the times in which he wrote; and who, being nearly contemporary with the events which he relates, and, indeed, with the earliest matter for record, cannot fall into mistakes and anachronisms in arts, or manners, or government, as he might have done, had he written at a more advanced and refined period.

It may be right, however, in this place to observe, that in proportion to the value of the historical information afforded by the works of Homer, and the implicit credit due to his testimony, we should be peculiarly scrupulous in admitting any passage which may possibly be spurious, although possessing the authority of his name. This is not the proper place to undertake an inquiry into the origin of the Homeric poems; but the multitude of interpolations, which are known to exist throughout these admirable productions, render the utmost caution necessary, especially where any hypothesis is to be maintained merely by a doubtful allusion or an insulated expression.

Whether either the Iliad or the Odyssey was the work of a single hand has been much doubted, perhaps with reason, but certainly with a considerable appearance of reason, supported by evidence both external and internal, so far at least as the Iliad is concerned. The total ignorance of the history, or even real name of their author, the variety of great poems, amounting to more than twenty in number, attributed to him by the ancients, and the contention of different states for the honor of his birth, are embarrassing circumstances when considered with reference to a single individual. But whatever may be the fact with respect to the author or authors of these poems, the great mass of both is undoubtedly of sufficient antiquity to be received as casting the strongest, and indeed the only, light we possess on the earliest ages of Grecian history. It is against the pretended genuineness of detached verses and small fragments that we should be on our guard, for such only are likely to be of recent introduction; and a few words on the manner in which these interpolations have found their way into the poems, will shew that such a corruption of the text was almost inevitable.

Without stopping to inquire whether the Homeric poems were consigned to writing at the period of their promulgation, or whether a written character was even known to their author, we may, in passing, remark the singular circumstance that he who alludes almost to every occupation of men, and draws his illustrations from all their pursuits, is wholly silent with respect to this valuable art, even where the mention of it would have been most obvious. But laying aside this inquiry, as well as the story of the labors of Pisistratus in first embodying the poems, we know the fact to be undoubted that they were for many ages chiefly preserved in the memories of rhapsodists, or professional reciters. If they were written at all, the copies were rare, for by the nation in general the poems of Homer were not read, but heard. The rhapsodists, often poets themselves, were persons who derived their support, as well as the respect paid to their character, from these recitations. Their popularity must have mainly depended on the interest of the parts which they delivered to their audience: hence we find that the more prominent events of the poems received particular names, and formed the subject of separate recitations. Plato in the Ion, which is a satire on the rhapsodists, ridicules their mercenary conduct; and from the motives by which they were actuated, it is obvious that their interpolations must have been frequent, in order that they might either avail themselves of the exercise of their own poetic talents, or gratify the vanity of their hearers by allusions to national tales, and subjects of local interest. The early peculiarities of the Greek language and archaic orthography of the Homeric age, were modified by succeeding reciters to suit the forms of speech prevalent in their own times; and hence the facility of interpolation was much increased, and the difficulty of detection proportionably augmented. From the manner in which the poems were handed down in detached portions, little read or critically examined until a comparatively late period, their condition cannot be considered as likely to secure the integrity of the text: for copies were not usually transcribed entire, but favorite parts were preserved according to the fancy of the possessor. Alcibiades is said to have beaten a schoolmaster who had not a single rhapsody of the Homeric poems in his school.

A certain test by which we may judge of the spuriousness of all passages is still a desideratum in criticism. The puerilities of the Greek writers, and their ignorance of the early state of their own language and history, is most unsatisfactory; yet the scholia of the Venetian manuscript of the Iliad, although published in a very corrupt condition, and the *obeli* of the Alexandrian critics, are valuable. The only certain light which can be thrown on this difficult subject, is afforded by the early language of Greece, where a competent knowledge of it is attainable. The Greek tongue has shared the fate of all others; it has been exposed to the constant operation of gradual change. The original Greek of the Homeric ages and of Apollonius Rhodius differ nearly as much as the English of Chaucer and Dryden. A knowledge of these early peculiarities is best obtained from the evidence of antient inscriptions, the legends of coins, and scattered notices in later authors; but more especially from an examination of the Latin language, which being derived from the Greek at a very early period of its existence, has retained a multitude of archaisms and forms of speech entirely unknown to the more modern, or Attic Greek. In restoring the actual text of the Iliad or Odyssey to its pristine condition, either by the insertion of the Aeolic digamma, or the application of any other rule derived from the sources just mentioned, we shall frequently find that the metre is violated; in these instances we may be certain that the verse has been constructed according to the usage of a more modern age. This is not the place to enumerate the different modes by which we may be enabled to approximate to a knowledge of the pure and genuine text of these poems: we may be permitted, however, to observe, in conclusion, that the successful execution of an endeavour to restore them to their primitive state would prove of inestimable value to the lovers of Grecian literature, and to the admirers of these noblest productions of human genius.

In the early stages of civilization, the main object of an assembled population would be security; for the attainment of which, we may remark the disproportionate and astonishing exertions used by various nations in their works designed for defence and protection; exertions which, by their more polished descendants, have usually been attributed to the agency of a supernatural power. Hence the vast labour bestowed on the construction of walls, the remains of which are so common in different parts of Greece, and which are the first, and certainly among the most wonderful specimens of building in that country. Of these the walls of Tiryns are the most ancient, and perhaps the most celebrated; Homer, in the catalogue, gives to the town the characteristic epithet of τειχιόεσσα[1], a clear proof that the walls were calculated

[1] Il. ii. *559*.

to excite admiration in his time as well as in our own. It is difficult to ascertain the precise date of their erection: they were said to have been the work of Lycians under the direction of Proetus, the brother of Acrisius[1]; this story would carry us five or six generations higher than the era of the Trojan war. In after times, however, from their massive and gigantic proportions, as well as from the absence of authentic information respecting them, they were generally considered as having been raised by the Cyclops. The description given by Pausanias is to this day correct[2]. These walls are about a quarter of a mile in circuit, and embrace a rising ground of inconsiderable elevation, situated in the plain of Argos. There are separate entrances, and leading from one of these may be seen a covered gallery or passage, formed in the thickness of the wall, the course of which it follows to some extent; the roof perfectly resembles that of the gallery in the great pyramid, being composed of single stones inclined towards each other, forming an acute angle by their junction.

In the vicinage of Tiryns, nearly coëval with it, but far surpassing it in extent, are the remains of Mycenae. This city, so distinguished at its first introduction to our notice, remained during the flourishing ages of Grecian history in a state of ruin and desolation. Tradition names Perseus as its founder, but the execution of the walls, like

[1] Strabo, lib. viii. p. 373. Pausan. Argol. c. 16. 25.

[2] Pausan. Argol. c. 25.

πεποίηται δὲ ἀργῶν λίθων, μέγεθος ἔχων ἕκαστος λίθος, ὡς ἀπ' αὐτῶν μηδ' ἂν ἀρχὴν κινηθῆναι τὸν μικρότατον ὑπὸ ζεύγους ἡμιόνων· λιθία δὲ ἐνήρμοσται πάλαι, ὡς μάλιστα αὐτῶν ἕκαστον ἁρμονίαν τοῖς μεγάλοις λίθοις εἶναι.

those of its neighbour town, is referred to the hands of the Cyclops. The condition of Mycenae is, I should suppose, very much that in which it was seen by Pausanias, or even by Thucydides five hundred years before: indeed, these stupendous masses, in their present dilapidated state, appear to be so indestructible as to defy the further injuries of time, as well as the violence of any force inferior to that which was employed in their construction. Pausanias informs us, that in his time among the ruins of the walls a gate remained, over which was the representation of two lions[1]. This gate, which seems to have been the principal entrance to the city, does not stand even with the course of the walls, but is placed considerably within the line described by their general circuit. The approach, therefore, is for some paces by a sort of passage between the walls, and scarcely of a greater width than the gate by which it is terminated. Defence was the object of this contrivance, by which few persons abreast could reach the entrance at the same time, and in the attempt must necessarily have been exposed to destruction from the weapons of the inhabitants stationed on the ramparts of each wall which formed the avenue. By the accumulation of earth this gate is buried nearly up to the top, where it is not more than eight feet wide, yet the lintel is one massive stone twelve feet in length. The jambs, which probably consist also of single stones, are inclined towards each other, the width of the opening being gradually diminished from the bottom; a contrivance by which the

[1] Pausan. Argol. c. 16.
*λείπεται δὲ ὅμως ἔτι καὶ ἄλλα τοῦ περιβόλου, καὶ ἡ πύλη· λέοντες δὲ ἐφεστήκασιν αὐτῇ.*

whole building is apparently strengthened, and which furnishes us with a singular coincidence with the manner of Egyptian building. The walls themselves have in their construction more of care and art, and, perhaps, exhibit the marks of a period somewhat later than those of Tiryns. For, although the blocks are nearly of the same dimensions, they are fitted together with greater exactness, and have been so shaped in part as to ensure some degree of regularity. The lions mentioned by Pausanias are executed in *bas-relief* on a single stone nine feet in height, and about thirteen feet in width. Their heads only are destroyed; between them is placed a species of small column supporting a capital of a singular form, on which their fore legs rest. Whether we are to view this work as possessing any mystic and symbolical meaning, or to explain it as an obvious and general emblem, or even as the private device and *impresa* of an individual, this is not the place to enquire. It may be sufficient to observe, that probably no example of Grecian sculpture is to be found of equal antiquity, and certainly none whose age is fixed by evidence in any degree so satisfactory.

There are many walls in various parts of Greece which from a resemblance in their construction, and, in some instances, even in their magnitude, to those of Tiryns and Mycenae have acquired the appellation of CYCLOPIAN. These may be considered as among the first attempts of Grecian art: although in assigning to them generally this early date some caution is requisite; for those characteristics which at Athens and Argos may properly be viewed as the unquestionable marks of the most ancient times, do not necessarily lead to a similar conclusion when found in Macedonia and Epirus. Perhaps the best criterion of antiquity is afforded by their massive and gigantic proportions, for we should scarcely be justified in indiscriminately referring monuments to these remote ages, solely from the appearance of a rudeness and peculiarity which may have arisen from ignorance, or even from the affectation of an archaism not unfrequently to be met with.

The same motives of defence and security which, during the unsettled and turbulent condition of Greece, at the first dawning of its civilization, prompted the small independent states to strengthen the walls of their cities with such incredible labour, seem very generally to have influenced these communities, as well as some of the more powerful individuals, in the measures adopted for the preservation of their wealth and valuable possessions. Treasuries were common in Greece at a very remote period. Minyas, who ruled the Boeotian Orchomenos, considerably before the era of the Trojan war, is said to have been the first who erected a building for this purpose[1]: and the consecration of precious offerings to Apollo at Delphi is coëval with the first notices of Grecian history. The wealth of the 'Minyaean Orchomenos' is celebrated in the Iliad[2]: and in the passage in which Achilles rejects the offers of Agamemnon, even although accompanied by all the riches inclosed in the 'stone

[1] Pausan. Boeot. c. 36.

[2] Il. ix. 381.

mansion of Apollo[1],' I think it highly probable that Homer alludes, not, as is generally understood, to a temple, which there is reason to believe did not exist at that time, but to some treasury, which, from the manner of building employed in these edifices, might well deserve the characteristic appellation of ΛΑΙΝΟΣ.

Many Grecian states had their separate treasuries at Delphi, as well as at Olympia. That of the Corinthians was built by Cypselus the father of Periander, about six hundred and fifty years before Christ. The treasury of Atreus and his family is mentioned by Pausanias as existing at Mycenae in his time, and there are other scattered notices of these early buildings occasionally to be met with in Greek writers. The artists of the heroic ages most celebrated in constructing these edifices were the brothers Agamedes and Trophonius, concerning whom many particulars are related, but of whom nothing certain is known, and whose very existence seems more than doubtful. They are not once mentioned or alluded to in the Homeric writings. A story is told by Pausanias[2] of their employing an artifice in building the treasury of Hyrieus, which by enabling them easily to displace a certain stone of the edifice, gave them the power of secretly entering, and of purloining the riches deposited there, at their pleasure. Agamedes was at last caught in a snare placed in the treasury for that purpose; and Trophonius,

[1] Οὐδ' ὅσα λάϊνος οὐδὸς ἀφήτορος ἐντὸς ἐέργει
Φοίβου Ἀπόλλωνος Πυθοῖ ἔνι πετρηέσσῃ. Il. IX. 404.

[2] Pausan. Boeot. c. 37.

finding it impossible to extricate him, cut off his brother's head, in order to prevent his own detection. All this, however, with additional circumstances of absurdity and disgust, is detailed by Herodotus in the words of the Egyptian priests, from whom he had the fable, and to which country the scene and actors exclusively belong[1]. We cannot therefore place any reliance on the tales respecting these brothers, nor ought we to give more credence to the greater performances ascribed to Daedalus, whose fabulous existence is still less equivocal[2]. This artist, it is true, is mentioned in the Iliad, but there can be no doubt whatever that we should consider the passage as spurious. It is to be found in the description of the shield, in which allusion is made to the representation of a dance executed by Daedalus in celebration of the victory of Theseus over the Minotaur, and his escape from the labyrinth[3]. No part of the story to which this relates is to be discovered in the Homeric poems, and although it would be superfluous to lose time in the detection of so manifest an interpolation, abundant proof may be afforded in few words from the account alone which

[1] Herod. lib. ii. c. 121.

[2] Herod. lib. ii. c. 148. All works of sculpture or other monuments of the highest antiquity and comparative merit appear to have been called Daedalian, which name signified in reality nothing more than skilful. Pausanias expressly says (Boeot. c. 3.) that statues were called Δαιδαλοι before the birth of Daedalus. ΔΑΙΔΑΛΟΣ therefore signified, in fact, only 'the artist.' For additional particulars containing a satisfactory refutation of the ancient accounts of this artist, see Goguet. orig. des Loix. tom. ii. p. 11.

[3] Il. xviii. 591, 2. The passage in the Odyssey in which mention is made of the flight of Ariadne with Theseus, has long since been universally given up as spurious. Od. xi. 320.

is given of the labyrinth. If a building of this nature ever did exist in Crete, a supposition probably unfounded, all writers agree in stating that it was constructed by Daedalus in imitation of that which he had seen in Egypt. Now Herodotus, the first author who has described, and in the most detailed manner, the Egyptian labyrinth, positively asserts that this stupendous edifice was the work of the twelve kings, that is to say, between six and seven hundred years after the date necessarily assigned to the Cretan Daedalus.

Perhaps the most interesting monument of these ages is the treasury of Atreus, still existing at Mycenae. It is a building of a conical shape, or, more correctly speaking, in the form of a paraboloid, about fifty feet in diameter, and rather more in height; the stones of which it is composed are of great magnitude; that in particular which covers the entrance is of enormous dimensions. They are placed in horizontal layers, each gradually projecting over the other until they meet at the top; the whole therefore has the appearance of a pointed dome, but the mode in which it is constructed denotes an entire ignorance of the principle of the arch. That the interior surface was formerly covered with plates of brass we have good reason to suppose, for large nails of the same metal, by which they were anciently fastened, still adhere to the stones in different parts of the building. The whole of this singular edifice is covered with earth, and presents in its outward form the resemblance of a mound or tumulus. This circumstance has, no doubt, suggested the appellation of the tomb of Agamemnon, which it usually bears, and which is also mentioned by Pausanias; but independently of his description of the subterranean treasury, which sufficiently points out the destination of this building[1], the Homeric rites of sepulture are too accurately detailed to render it possible for us to admit the probability of such a supposition. Some few remains of the treasury of Minyas are still to be seen at Orchomenus; and from these, as well as from the account of Pausanias[2], there is little doubt that it was precisely similar to that which has just now been described. An ingenious traveller, who had never heard of the building at Mycenae, and whose premature death prevented him from ever seeing it, by measuring these remains and applying them to the restoration of the original design, produced a building, in plan differing in no respect from the treasury of Atreus. The scattered notices which we possess of works erected throughout Greece for the same purpose, contribute to remove all doubt as to the origin of the structure, which, by a conjecture equally erroneous, has been sometimes denominated the temple, as well as the tomb of Agamemnon. It is to be observed that the later treasuries, although they preserved the circular form, were often built with porticoes in front. Pausanias describes the treasury of Megara at Olympia as having the war of the giants represented in the tympanum of the pediment[3]; from which it is evident

[1] Pausan. Cor. c. 16.

*ἐν δὲ τοῖς ερειπίοις—'Ατρέως καὶ τῶν παίδων ὑπόγαια οἰκοδομήματα, ἔνθα οἱ θησαυροί σφισι τῶν χρημάτων ἦσαν.*

[2] Pausan. Boeot. c. 38.

[3] Pausan. El. post. c. 19.

that there must have been a portico. It is not unlikely that the Pantheon at Rome, which corresponds with this description, may originally have had a similar destination.

If we seek for those parts of architecture properly termed ornamental, which were known to Homer, we shall discover scarcely any thing to answer this description, and nothing which can afford the least intimation of his having possessed any knowledge of those varieties under which the different modes of building have since been classed. The chief decoration of the age seems to have consisted in a polished surface. The stones were large, well-fitted together, and above all perfectly smooth. The charm and grace of forms were unknown: for although the chambers and buildings themselves are sometimes said to be lofty, there is no indication of any symmetrical proportion. In the imaginary palace of Alcinous, which is intended as the model of ideal perfection in the art, no attempt is made to describe architectural beauties: but to compensate for the defect, no exaggeration is spared to make it rich. We have brazen walls and golden doors, with silver posts and lintels[1]. The palace of Menelaus is represented in nearly the same general terms of magnificence. It was full of brass and gold, silver and ivory: it was resplendent as the sun and moon, and appeared in the eyes of Telemachus like the mansions of Jupiter himself[2]. All this seems pretty clearly to indicate the total deficiency of what can with any propriety be called architectural ornament.

[1] Od. vii. 88.

[2] Od. iv. 45. 74.

Perhaps we may in a great measure ascribe the simplicity which reigned in these early buildings to the peculiar superstition of that period. It is certain that the same spirit of devotion which in succeeding times filled every state with splendid monuments of art did not then exist, and I think there is great reason to believe that in the Homeric age temples were even scarcely known in Greece. It is remarkable that in the Iliad mention is but once made of any Grecian temple, and I think there will be little difficulty in proving this passage to be an interpolation. In the catalogue of the ships, when the forces of Athens are enumerated, they are called 'the people of the noble 'Erectheus, whom the fertile earth produced, and whom 'Minerva nourished. She placed him in her own rich 'temple, where he is annually propitiated by the Athenian 'youth with sacrifices of bulls and lambs[1].' To disprove the authenticity of this passage, it is sufficient to state that throughout the Iliad there is no indication which can lead us to suppose that Homer was acquainted with the practice of hero-worship. Divine honors were not paid even to Hercules, or to any of those mortals who afterwards became objects of adoration in Greece. The origin of the interpolation may be easily traced to the desire of some Athenian rhapsodist, to gratify his own national vanity, and that of his audience at the expence of truth. There existed

[1] Il. ii. 547. It may be presumed, and the notion is sanctioned by authority of the greatest weight on the subject of the early state of the Greek language, that the personification of the earth under the title of ζείδωρος Ἄρουρα is not Homeric, but of a much later age. It again occurs Od. xi. 308.

in Athens a most ancient temple dedicated to both Minerva and Erectheus, in which they had their respective altars, and which was perhaps more revered than any other building in the city. This connection, so sacred, so gratifying, the memorials of which were of an antiquity so high, might, without much scruple, be made to receive additional dignity from its insertion in the divine work of Homer.—In Troy, however, we find a temple of Minerva is mentioned, although without any description or circumstance of ornament.—The doors are opened, and the goddess is approached[1],—the building, indeed, appears to have been solely intended as a sort of shrine or receptacle for the statue. Allusion is likewise made, but unaccompanied with any particulars, to a temple of Apollo in the vicinity of the same city[2]. In the Odyssey notices may occasionally be found of sacred buildings even in Greece, and this is to be considered as one, among other indications, which mark that poem as the production of a later age.

The early Greeks therefore, being in a great measure deprived of this abundant source of future magnificence, their chief display of skill and splendor in the art was confined to the erection of the habitations of their princes, and to the buildings dependent on them. These, as I have already stated, appear to have possessed little of architectural ornament. It is not my intention, however, to attempt any minutely-detailed description of these edifices, for the

[1] Il. vi. 297.—θύρας ὤϊξε Θεανὼ—

[2] Probably in Tenedos. Il. i. 38. Il. 446. Il. vii. 83.

inquiry, although not uninteresting, being unassisted by the remains of any coëval monument, and being founded on the disputed interpretation of various passages, some of which are themselves of doubtful antiquity, cannot be expected to lead to any very accurate result[1]. A general view of this species of the Homeric architecture will be sufficient, preserving at the same time some attention to such particulars, as from their character of ornament may serve to afford a more correct notion of the state of the art.

These mansions, whose chief recommendation was constituted by solidity and extent, were built round a court; a plan universally adopted in succeeding ages, and which still prevails in the same countries. The palace of Priam answers this description; it was composed of hewn stone, constructed with open chambers or porticoes, and in addition to the part occupied by the old king, contained fifty apartments allotted to his sons, and on the opposite side of the court twelve separate habitations for his sons-in-law and their wives[2]. The chambers in general of the Homeric buildings, with the exception of the great hall of the palace, appear to have been small, at least no expression occurs respecting them which can lead us to think otherwise. Rich furniture was not uncommon; the seats and couches were frequently distinguished by their costly materials and beautiful workmanship[3]; but the chief decoration consisted, probably, in the magnificence of the arms, and in the skilful manner in which they were arranged[4].

[1] See the explanation of Plate 5, Section iv.

[2] Il. vi. 242—50.

[3] Il. xi. 644. xviii. 390. Od. xx. 160.

[4] Il. vi. 321.

We may conclude that the form of the roof was pointed, for in the funeral games when Ajax and Ulysses grasp each other for the purpose of wrestling, they are compared by Homer to two beams of the roof, which some able architect had closely fitted together at the summit[1]. These rafters in subsequent ages retained the appellation by which they are characterised in the Iliad[2]. Terms of admiration are sometimes used in mentioning the beams[3], but they are vague, and contain nothing descriptive of their quality. It is not easy to conjecture in what their beauty may have consisted, unless perhaps in strength and suitable proportion. The interior part of the roof it would seem was usually left open to the top, with the insertion however of other timbers, in order to afford additional security. Columns supported the horizontal beams, to one of which the goat-herd Melanthius was drawn up and bound by order of Ulysses until his execution[4]. From one of the beams also, Minerva in the figure of a bird, beheld the destruction of the suitors[5].

[1] Il. xxiii. 712. [2] Poll. x. lib. 1. c. 8. [3] Od. xix. 37.
[4] Od. xxii. 195. [5] Ib. 239.

There is a passage in the Orestes of Euripides, which not only indicates the ancient construction of roofs to have been of this description, but which, if it were possible to give any credit to the accuracy of the Greek tragedians in these matters, would at once convince us of the existence in the Homeric mansions of those ornamental distinctions of Doric and Ionic architecture which were the creation of a later age. After the murder of Helen at Argos, her Phrygian attendant informs the Chorus that he escaped from the palace over the cedar beams of the roof and the Doric triglyphs.

*Κεδρωτὰ παστάδων ὑπὲρ τέρεμνα,*
*Δορικάς τὲ τριγλύφας.*

Escaping by the Doric triglyphs may, perhaps, mean passing through the metopes, which seem anciently to have been left vacant, for the purpose of admitting air and light into the building. Orest. 1378. et vid. Schol.

Homer extols the skill of the Trojan architects: a sufficient proof of the superior advances made by the Asiatics in the art; and yet it is remarkable, that neither in the palace of Priam, nor in that of Paris, said to be raised by the most able workmen, is there any thing which indicates the appearance of ornament, excepting the mention of polished stone[1]. This, indeed, seems to have composed the main beauty of the Homeric buildings. In imaginary edifices the materials are sometimes changed, and we find a profusion of the precious metals employed in their construction; but this, as I have before observed, is an additional proof of the poverty of the architectural decoration. From the frequent mention of hewn and polished stone in the most costly and magnificent mansions, it would appear that the general practice in the time of Homer himself was confined to the employment of those irregular masses still to be seen in the walls of Tiryns. In the Odyssey, however, amongst the details of the palace of Ulysses, the marks of an age somewhat later are discoverable.

It is not certain that the author of the Iliad had any knowledge of houses formed in regular divisions of stories. Two passages evidently alluding to such buildings are of doubtful antiquity[2]; and the true meaning of a third has, I think, been forcibly bent to this interpretation[3]. In the Odyssey, mention of the upper chambers, especially as the residence of women, frequently occurs.

The use of columns was not unknown to the author of

[1] Il. vi. 315. [2] Il. ii. 514. xvi. 184. [3] Il. vi. 248.

this latter poem, although neither the word itself, nor the thing signified, is to be found in the pages of the Iliad. It may be requisite here to pay some attention to the columns in the palace of Ulysses; more especially as from a bare allusion to the fact of their existence, it might be thought unjustifiable to exclude them from the appellation of architectural ornament. It is first to be observed, that these columns form no part of the exterior building; their use is not only confined to the interior, but for any thing that appears to the contrary, exclusively to the great hall of the palace. Their employment in that situation was obviously dictated by necessity. From the ample space of the apartment, some support, in addition to the lateral walls, was required to give security to the beams which composed the roof; this security, we may conclude, was obtained by the insertion of a row of columns passing longitudinally through the centre of the chamber[1]. Such was the cause and mode of their introduction. According to the general opinion, the material of which they were formed was wood: and the accuracy of this opinion is confirmed by the nature of their origin and use, as well as by a combination of circumstances which unite for this purpose. Throughout the Odyssey the mention of columns is purely incidental: they are never described in detail, nor do they make part of any description

[1] It is remarkable that, in the Odyssey, frequent mention is made of the 'lofty column,' or the 'great column,' as a single object: indeed if it were not for the passage (xix. 36.) in which the columns are distinctly referred to in the plural number, we might almost be tempted to imagine that Homer intended to describe an apartment in which the beams of the roof were supported by a single column.

of architectural magnificence. Epithets of admiration are frequently bestowed on the walls, the doors, the beams and the pavement, while the column is never said to be well built, well polished, or aptly proportioned. The height only is occasionally alluded to. This rare and casual mention, and always as a feature of so little prominence, seems clearly to evince that Homer, at least, never imagined that his palaces would derive additional beauty and splendour from its introduction.

From these considerations it may be evident that we cannot assent to an ingenious conjecture formed by Mr. Knight, and since frequently repeated, respecting the origin of the fluting in columns. The conjecture is founded on a passage of the Odyssey, in which Minerva, on entering the hall of Ulysses, is said "to place her spear by the tall "column, within the well polished spear-holder, in which "were many others belonging to the prudent chief[1]." This spear-holder has been understood to mean one of the channels of the fluting. The word, however, seems clearly to allude to a single and capacious repository of arms adjoining to the column, or constructed in it. The spears of Ulysses are not said to be ranged around the column, each in its proper spear-holder; one repository only is mentioned, which contained the weapons of the prince, and in which Minerva placed hers also. It is thus explained by Eustathius, who calls the spear-holder a receptacle formed in the column for the

[1] Od. i. 127.

ἔγχος μέν ῥ᾽ ἔστησε φέρων πρὸς κίονα μακρὴν
δουροδόκης ἔντοσθεν ευξόου, ἔνθά περ ἄλλα
ἔγχε᾽ Ὀδυσσῆος ταλασίφρονος ἵστατο πολλά.

convenience of containing the spears in an upright position[1]. The illustrations of the word given by Suidas, Hesychius, and Pollux[2], are perfectly consistent with the interpretation here stated, and afford not the slightest intimation of an architectural origin. If the true meaning of the passage were less obvious than it really is, however ingenious the conjecture, there would still be strong presumption against its accuracy. That an operose contrivance should have been resorted to for this simple and useful purpose seems so highly improbable, that, even if ΔΟΥΡΟΔΟΚΗ must be considered as connected with, and in manner forming part of the column, the explaining it to mean some substance fixed to the column, and so fashioned as to receive and support the spears, would surely describe a more natural invention than that of twenty channels laboriously cut around it, and which, at the same time, presented a place of deposit for the weapons much less secure and commodious. The very epithet of 'well-polished,' or 'well wrought,' which is applied to the word, is so entirely dissimilar from all those used in describing the columns, that it must be considered as alluding to something of a more ornamental construction, whatever may have been the substance of which it was composed[3]. The spear-holder

[1] Eustath. in Loc.

ὅτι δουροδόκη ἔστι θήκη δοράτων κιονειδής ἢ μάλιστα εἰς κίονα ἐγγεγλυμένη, ἐν ᾗ πρὸς ὀρθότητα τὰ δόρατα ἵσταντο.

[2] Suid. in Loc. Hesych. in Loc. Poll. l. i. c. 10. l. vii. c. 33. l. x. c. 33.

[3] Achilles withdraws his spear from the long sheath, or case, (σύριγγος) in which it had been preserved. (Il. xix. 387.) The Homeric spear was nearly seventeen feet long (Il. viii. 494.), so that Mr. Knight, who admits the massive proportion of columns to be regulated by their comparative antiquity, can scarcely expect, in the very first ages of the art, to find them of a height, which, with the capital, would give a diameter of nearly five feet.

mentioned in the passage might possibly have been something calculated for the safe preservation of such weapons as were peculiarly valuable: for, it is manifest, that the usual mode of disposing the spears was not against the columns, from the circumstance of the suitors, when Ulysses begins their destruction by the slaughter of Antinous, looking around for arms—not to the columns, but to the walls of the hall, from whence they had been previously removed by Telemachus.

> *ἐκ δὲ θρόνων ἀνόρουσαν ὀρινθέντες κατὰ δῶμα,*
> *παντόσε παπταίνοντες ἐϋδμήτους ποτὶ* ΤΟΙΧΟΥΣ,
> *οὐδὲ πη ἀσπὶς ἔην, οὐδ᾽ ἄλκιμον* ΕΓΧΟΣ *ἑλέσθαι.*[1]

A few words remain to be added concerning that part of the Homeric buildings which has usually been called the portico; an appellation, however, which is very far from affording any just notion of its real nature and appearance. No intimation whatever is given that it was constructed with columns, nor from any thing that appears in the pages of the Iliad or Odyssey is there reason to believe that they formed a part of its composition. A portico without columns cannot be said to suggest ideas of much architectural beauty, and, in fact, the terms employed in its description are not such as to justify a belief that any thing ornamental was intended to be expressed by them. Twice only is it mentioned that these porticoes were polished or well wrought; and it is to be observed, that in one instance the divine mansion of

[1] Od. xxii. 23.

Jupiter himself is alluded to; and in the other the splendid and Asiatic palace of Priam[1]. The etymologies given of the word ΑΙΘΟΥΣΑ are by no means satisfactory, but we may nevertheless collect sufficient from these, as well as from the text of Homer, to enable us to form a probable conjecture of its description and use. It seems to have been a species of raised platform or exedra, probably covered at the top, but exposed at the sides to the air, and to the enjoyment derived from this exposure we may chiefly attribute its origin; at least this is the purpose to which we find it generally applied, and the most rational explanations of the word justify this supposition[2].

The influence of the same climate, and the pleasure afforded by this practice in all ages to the inhabitants of southern countries, lead us to expect that we should still discover the existence of a similar custom. In this expectation we shall not be disappointed. There is scarcely a house of any magnitude in Greece or Asia-Minor which does not possess a kind of balcony attached to it, and frequently extending entirely round a court. Whatever may be the grandeur of the mansion, these are always formed of wood, and in a slight manner; in the day-time they are the resort of those who seek the freshness of the open air, and at night, being spread with carpets or skins, they become a sleeping place for travellers, especially for those of an inferior rank. The ΑΙΘΟΥΣΑΙ of Homer will be found in their use to coincide with this description, and there is no reason

[1] Il. xx. 11. vi. 242.

[2] Vid. Hesych. in Αἰθ.

to imagine that in their appearance they were very dissimilar[1].

Whatever be the precise date we may assign to the age of Homer, it is certainly to be viewed as nearly contemporaneous with the occurrence of an event which forms a most important era in the history of Greece. By the return of the Heraclidae to the Peloponnesus, and the circumstances attendant on the conquest of the peninsula, a change, equally extensive both in the manners and in the political condition of the inhabitants, was effected. Bloody wars, and the conduct of the Dorian invaders, contributed to check the advances which had already been made in refinement, and to plunge the country into a state of comparative ignorance and barbarism. How long these ages of darkness continued it would be difficult with any accuracy to determine; but, for several centuries after the return of the descendants of Hercules, the history of Greece presents nearly a total blank. During the heavy pressure of such causes, the progress of ornamental architecture, we may be certain, as well as of all those arts of civilization which had previously been cultivated with success, was entirely arrested.

In this situation, therefore, it is manifest that any inquiry must be fruitless which has for its object to ascertain in

[1] Il. xxiv. 644. Od. iii. 399. vii. 336. xx. 170.

According to Pollux, it seems to have been a species of inner court. Onomast. lib. i. cap. vii. *καὶ αὐλὴ τὸ ἔνδον, ἣν αἴθουσαν Ὅμηρος καλεῖ.*

In the Odyssey it is said that, in the court of Alcinous, while skins and carpets were prepared in the portico for the bed of Ulysses, as a stranger, the king himself retired to rest in the interior of the palace. vii. 344.

what manner and at what period the art became possessed of those characteristics which subsequently distinguished the different orders of building. Vitruvius, in the absence of all history or authenticated tradition, recounts a fable respecting their origin, which is utterly incredible, and in itself absurd. He says, that Dorus, the son of Hellen and of the nymph Opticos, built a temple of Juno in Argos, which, *by chance,* was of this (Doric) kind, although none of the proportions, he adds, were regulated or known at the time. The Ionian colonists on their arrival in Asia, wishing to erect a temple to Apollo-Panionius, and being ignorant of the proper method of proceeding, bethought themselves of measuring the human foot, and having discovered that it was about the sixth part of a man's height, they at once adopted this proportion in the columns of the order, which thenceforth they called Doric. At the same time, in building a temple to Diana, the style of which was to receive their own name, they wished to give a female character to the columns employed; for this purpose their height was increased to eight diameters, in order to render their appearance lighter and more slender. Bases were added instead of slippers, the volutes and ornaments of the capitals resembled the head-dresses of the time, and the manner of fluting the shaft was copied from the folds to be seen in the drapery of the matrons of those days[1]. It is unnecessary to pause for an instant in the refutation of these dreams. The fact is, that the different modes of building received their present appellation long after the date of their invention,

[1] Vitruv. l. iv. c. 1.

whenever that event may have taken place. It was entirely owing to the continued observation and comparison of the general practice that obtained in European Greece, with that manner of building which was almost exclusively in use among the Asiatic colonies. It is impossible, therefore, to attempt to describe the origin, or to fix the era of this grand distinction which so early prevailed in the history of the art. Perhaps the most ancient example of the existence of these two orders is to be found in the account which Pausanias gives of the Sicyonian treasury at Olympia; at least it is the first which is accompanied with the mention of any circumstances entitled to belief: and even this is not quite satisfactory, inasmuch as it appears that the respective orders have reference only to interior decoration. The treasury was built by Myron, the tyrant of Sicyon, in the thirty-third Olympiad, or about six hundred and fifty years before Christ. He made in it two chambers, one Doric, the other Ionic. They were worked with brass. An inscription containing the dedication to Jupiter, and specifying the weight of the metal, was to be seen in the building[1]. Whatever may have been the precise nature of the architectural ornaments of the Sicyonian treasury, it is probable that in their general appearance they were in conformity with the practice observed in succeeding ages.

It is not easy, in the absence of historical information,

[1] Pausan. El. post. c. 19. The story of Acrisius and the brazen chamber of Danaë, there is little doubt, refers to a building similar to these treasuries, the interior of which was covered with brass. (Pausan. Cor. 23.) It has already been said that the indications of the plates of this metal, in the treasury of Atreus, are clearly apparent.

to assign with any certainty their true dates to the buildings of antiquity, or from the peculiarity of their remains to fix the period of their construction. The remarkable similarity of manner which prevailed throughout Greece for so many ages is the chief cause of this difficulty. Unlike the gradual progress of Gothic architecture, in which the regular variation of style and ornament furnish conclusive evidence of the era of the work, the buildings of Greece generally preserved the same uniformity of design and chaste simplicity of execution; the changes which have taken place in the Grecian orders, and the differences which exist, are nearly confined to the details of the art, and in many instances are scarcely perceptible to the common observer. It is unnecessary to undertake any technical description of these minute varieties: our present purpose will be sufficiently answered by a general notice of the more conspicuous edifices of Greece, with a reference to the writings of those authors by whom they have been most accurately measured and delineated.

As the DORIC style continued, with few exceptions, to be generally adhered to by the European states of Greece until the time of the Roman conquest, the examples still remaining are numerous. One of the most ancient is to be found in the temple of Jupiter Panhellenius in Aegina. It is said by Pausanias to have been built by Aeacus considerably before the Trojan war; a story wholly incredible, but which serves to prove that it had outlived all tradition of its real origin. It is still nearly entire, and the position it occupies is very striking, being placed on the summit of the highest mountain in the island, and commanding a most beautiful prospect of the surrounding sea and land[1].

The site of the temple of Jupiter at Olympia has been recently ascertained : some vestiges of this celebrated edifice are yet to be discerned on the banks of the Alpheus. The excavations performed by the inhabitants of the neighbouring villages in order to procure stone and marble for their own purposes, have in great measure laid open the ground plan of the temple, together with the lower part of some of the columns. The description of Pausanias is minutely accurate. It was built of stone, and covered with a marble roof, cut in imitation of tiles, an invention which has been thought of sufficient merit to preserve the name of its author[2]. The architect of the temple itself was named Libon, of whom we hear nothing elsewhere; but the age of the building may probably be carried as high as six hundred years before the Christian era[3].

In mentioning the earliest monuments of Grecian

[1] Pausan. Cor. c. 30. Ionian Antiq. vol. ii.

An interesting discovery has lately been made among the ruins of this building; a large portion of the statues that formerly occupied both pediments of the temple has been recovered, by removing little more than the surface of the earth immediately beneath them. This sculpture, although, probably, not coëval with the temple itself, is undoubtedly of high antiquity. The style of work conclusively denotes a period at least as early as the Persian invasion; and, indeed, immediately after that event, the state of Aegina underwent such an entire change, that even if the mode of sculpture were less decisive than it really is, we could scarcely refer to any subsequent age, the execution of a monument of this description.

[2] Pausan. El. prior. c. 10. Byzes of Naxos, who lived about the fortieth Olympiad.

[3] Pausan. El. prior. c. 10. Strab. lib. viii. 355. For some measurements, see Antiq. of Magna Graecia. Appendix.

architecture it is impossible to exclude the remains of a Doric temple at Corinth, consisting of five stone columns, which still support their architrave. It has been supposed that this temple was dedicated to Venus; but, in fact, no information is to be obtained respecting its origin. Whatever may have been its destination, no one can doubt, from the appearance of the ruins alone, that they formed part of a structure of the most remote antiquity[1].

Although it be not more easy to fix with any precision the periods at which the Grecian temples in Sicily were erected, there are certain historical facts which may guide us in an attempt to ascertain the limits of the time within which it must have taken place, and by which we may be enabled, if not accurately to verify, at least to approximate the dates of these different buildings.

The city of Selinus, whose stupendous ruins are the admiration of modern times, was founded by a Greek colony from Megara, six hundred and fifty years before Christ; and destroyed in the invasion of the Carthaginians, two hundred and fifty years after its foundation. From the testimony of historians it appears, that on this occasion the temples were spared, as in a second invasion their destruction is mentioned. It is clear, therefore, that they were in existence four hundred years before our era. If we consider the number and magnitude of the buildings, it will not be thought too great a concession to admit, that some among them at least were begun a century before this period, or about five hundred

[1] Stuart's Athens, vol. iii. c. 5.

years before the birth of Christ: it is even probable that the Greek colonists would not suffer the space of one hundred and fifty years to elapse before they employed themselves in the performance of a duty which with them seems to have been generally paramount to all others. By what means and under what circumstances the magnificent edifices of Selinus were raised we are entirely ignorant; their appearance strongly indicates the existence of wealth and power, but the history of the state is nearly comprised in the bare record of its foundation and destruction[1].

The Corinthian colony which established itself in Sicily is said to have taken possession of Syracuse so early as the middle of the eight-hundredth century before Christ. The details of the history of this city offer no means of determining the time at which the first temples were erected: if we reflect, however, within how short a period after the migration of the Corinthians the country became an object of the greatest desire to the Carthaginians, it does not seem improbable that its riches and splendour should have been of rapid growth. The remains of the temple of Minerva situated in Ortygia, that part of the city which was first inhabited, bear every mark of the highest antiquity[2].

The temples of Agrigentum, numerous and costly as they are[3], appear to have arisen during little more than a single century. The prosperity and independence of the city commenced with Theron about four hundred and fifty years before Christ; after the battle of Himera his thoughts

[1] Antiq. of Magna Graecia, c. 4.
[2] Ibid. c. 2.
[3] Antiq. of Magna Graecia, c. 3.

were entirely turned to its decoration, and the Carthaginian prisoners were made to assist by their labour in the erection of trophies to perpetuate the glory of their conquerors. The Agrigentines continued in this employment until a second and more successful invasion of the Carthaginians found them occupied in completing the temple of Jupiter Olympius, the greatest in the island, and one of the most stupendous monuments of ancient times. The capture of the city by Hamilcar in the ninety-third Olympiad prevented its completion, and according to Diodorus it continued ever afterwards in the same unfinished state.

The history of Paestum is barren of incident, but some important facts are authenticated, which serve in a considerable degree to fix the age of the great hypaethral temple, if not of the other buildings which still remain within the walls. The first inhabitants of the city were dispossessed by the Sybarites, who quietly enjoyed the fruits of their conquest for more than two hundred years[1]. The first hostile attack was made by Dionysius, who, although he retired into Sicily without achieving his object, yet left the state so enfeebled that it shortly after fell into the hands of his Lucanian allies. This happened nearly three hundred and fifty years before the Christian era. In the course of about seventy years more it yielded to the growing power of Rome, became a municipal town of the empire, and received a Roman colony[2]. There can be little doubt that we ought to date the construction of the great temple during

[1] Strabo. lib. iii.

[2] Vell. i.

the time in which the city remained under the dominion of the settlement from Sybaris. The marks of ancient Grecian art are indelible [1]; yet, even if the Lucanians possessed skill and taste sufficient, they wanted the ease and leisure and security requisite for so considerable an undertaking. How far we ought to attribute the construction of the other remains at Paestum to the Lucanians, or to the Roman colonists, it is unnecessary at present to enquire; the origin and antiquity of the hypaethral temple, at least, are clearly ascertained. The buildings of Magna Graecia may probably be classed in the following chronological order—Syracuse, Paestum, Selinus, Segesta, and Agrigentum [2].

Immediately next to these in the relation of time, but in real grandeur and beauty to be classed above all the architectural efforts of ancient or modern times, come the Athenian temples. Here we may pause on the full perfection of the art; after this period nothing was added; perhaps in the course of a few years its gradual decline commenced. We have no difficulty in accurately fixing the dates of these buildings. Mnesicles began the Propylea in the eighty-fifth Olympiad; the Parthenon was built by Ictinus a few years later, during the time in which Pericles exercised unlimited controul in the management of public affairs, and when his popularity had left him

[1] Antiq. of Magna Graecia, c. 6.

[2] An attempt to trace the history and progressive improvement of the Greek states of Sicily and Italy, especially of the latter,—to enquire into the sources of their astonishing wealth and power, would be an interesting and valuable work. The materials, it is true, are widely dispersed, and perhaps are not ample, but the field is yet untrodden.

without a rival in Athens. They were both raised under the direction of Phidias, to whose superintendance this munificent statesman committed the execution of all his plans of elegance. The temple of Theseus may be considered as nearly coëval with the buildings of the Acropolis, or perhaps of a somewhat earlier origin. If we suppose this splendid monument of Athenian taste to have been destined for the reception of the ashes of their national hero, its commencement ought to be placed soon after his remains were transported from Scyros to Athens, and when funeral games were instituted in his honour. The expedition of Cimon, the son of Miltiades, was forty years prior to the time in which Pericles possessed that influence which enabled him to apply the resources of the republic to these purposes of magnificence[1]. The striking remains of the temple of Minerva, on the promontory of Sunium, are in all probability to be attributed to the same authors; but one of the noblest efforts of the genius of Ictinus is to be seen in the temple of Apollo Epicurius in Arcadia, which although still nearly entire, has been little explored or even visited[2]. According to the testimony of ancient writers, it surpassed in beauty, with a single exception, all the other buildings of the Peloponnesus. It is situated on an elevated part of mount Cotylus, three or four miles from the ruins of Phigalia, and commands one of the most enchanting

[1] Plut. in vit. Pericl. Pausan. Attic. c. 17. Plut. in vit. Cimon. Stuart's Athens, vol. ii. iii.

[2] Pausan. Arcad. 41.

For some measurements and peculiarities, see Antiq. of Magna Graecia. Appendix.

prospects which it is possible to conceive;—woods, hills, and vallies lie before it in wild confusion; the distance is terminated by the sea, and the venerable oaks with which the temple itself is surrounded, confer an additional solemnity and grandeur on the scene.[1]

Sixty years after the death of Pericles, in the hundred and second Olympiad, Epaminondas having broken the power of Lacedaemon, restored the Messenians to independence, and built the city of Messene. From the extensive ruins which are still visible of the various public edifices, it does not appear that the art had yet suffered any material deterioration[2]. In a very short time, however, it was destined to experience a considerable change, at least if we may judge from the proportions of the portico in the island of Delos, on which is inscribed the name of Philip of Macedon[3]. This building could not have been erected after the hundred and tenth Olympiad, the last year of which was marked by the assassination of that prince. After this period the Doric order gradually fell into disuse, and was

[1] A discovery, similar to that at Aegina, has been made among the ruins of the temple of Apollo: in this instance there is no reason to doubt that the sculpture is coëval with the building itself.

[2] Diod. Sic. lib. xv. 66. Pausan. Messen. c. 27.

The walls of the city merit particular attention. In many parts they are still entire, and are to be traced throughout the whole extent of their ancient circuit. They present the most beautiful and perfect specimen of the military architecture of the Greeks, being fortified and adorned with numerous towers and gates. They are described by Pausanias as superior to the walls of Byzantium and Rhodes, and indeed to all that he had seen (Messen. c. 31). It is to be lamented, that no traveller or artist has as yet given us any details of these most interesting remains.

[3] Stuart's Athens, vol. iii. c. 10. Tournefort, t. i. lett. 7.

at first nearly superseded by the Ionic, and ultimately by the Corinthian style of architecture. The catalogue may therefore be closed with the mention of the portico of Augustus at Athens, which is, I believe, the most recent structure of this description now existing in Greece[1]. Having briefly enumerated some of the principal Doric remains, which in spite of the lapse of time, the fury of religious zeal, and the barbarism of conquerors, are still permitted to attest the magnificence and taste of the country which produced them; it may not perhaps be uninteresting or useless if we attempt to inquire into the indications of their comparative antiquity, and to ascertain what are the peculiarities which may enable us to fix with some degree of probability the respective dates of buildings not described by ancient writers, and of which the origin is entirely unknown.

A reference to the different proportions of the columns and their entablature has been supposed to afford a criterion of the antiquity of the edifice. Columns, in the earliest ages, are said to have been invariably low and their entablatures massive; but as the art advanced, the entablature, it is affirmed, gradually diminished, and the columns became more lofty and slender. This observation may be of great service in determining the age of Grecian monuments, but although it ought always to be kept in view, we should not be justified in its universal application. Pliny says, that according to the most ancient method, the columns were

[1] Stuart's Athens, vol. i. c. 1. This building is conjectured to have been an entrance to the Agora.

only a third part of the height of the whole building[1]. It is likely that in the infancy of the art an appearance of this kind should have been produced by a general desire to obtain strength, and from an ignorance of the weight which might with safety be placed on a vertical shaft: but the fact is, that several remains of the highest antiquity form exceptions to these rules. There are, however, other peculiarities which may furnish material assistance in this inquiry, the most prominent of which is the depth of the capital compared with the upper diameter of the column. When this is found to vary in the same proportion with the parts already described, the test acquires an additional confirmation. To see how nearly the chronological order we have assumed is borne out by the comparative lowness of the columns, and the depth of their capitals, let us take a number of examples from the temples to which we have alluded, and first arrange them according to the proportion of the diameter compared with their height, and then according to the depth of the capitals compared with the upper diameter of the column.

The first scale shews how many times the lower diameter is contained in the height of the column, the second denotes the proportion of the depth of the capitals to the upper diameter, in decimals. It will be seen, from the relative proportions, that both scales distinguish, by a marked difference, the temples of Sicily from those of Athens and its neighbourhood.

[1] Plin. Hist. Nat. lib. xxxvi. c. 22.

| No. I. | | No. II. | |
|---|---|---|---|
| Hexastyle at Selinus | 4.339 | Juno at Agrigentum | .639 |
| Minerva at Syracuse | 4.410 | Hexastyle at Selinus | .637 |
| Octastyle at Selinus | 4.478 | Minerva at Syracuse | .636 |
| Juno at Agrigentum | 4.695 | Concord at Agrigentum | .634 |
| Concord at Agrigentum | 4.807 | Octastyle at Selinus | .603 |
| Parthenon at Athens | 5.566 | Theseus at Athens | .508 |
| Theseus at Athens | 5.669 | Parthenon at Athens | .477 |
| Propylea at Athens | 5.764 | Propylea at Athens | .470 |
| Minerva at Sunium | 5.899 | Minerva at Sunium | .458 |
| Portico of Augustus | 6.042 | Portico of Augustus | .408 |

There are other signs which mark the antiquity of columns, one of which is the three grooves sometimes found at the hypotrachelium, or necking of the shaft. Although these do not occur in every example of the earliest temples, they are never to be discerned in those of later date; and when inserted, may invariably be considered as the work of a remote age. Another proof is to be met with in the form of the guttae, or drops, below the triglyphs. These in the most ancient specimens are frequently deep, and, excepting the temple at Paestum, in which they are conical, of a cylindrical shape. In the more modern instances they are comparatively little in depth, and generally trochoidal, or pulley-formed.

The invention of the Ionic order of architecture appears to have been coëval with that which prevailed in European Greece; and although chiefly confined at first to the Asiatic states, it became in the progress of time more generally attractive than the severe beauties of the rival style. The earliest specimen, of which any remains are to be found, is the celebrated temple of Juno at Samos. This in the age of Herodotus, was considered as the largest and most stupendous edifice ever raised by Grecian art. It was built about the sixtieth Olympiad, by Rhaecus and Theodorus, two natives of the island; and the style, possessing many peculiarities, is such as strongly to denote its archaic origin[1]. The bases of the columns are remarkable from the number and complication of their parts; the shaft is not fluted, nor is there any appearance of volutes to the capitals: the most ancient examples of this species of ornament are to be discovered on the coins of several cities, and on earthen vases, where an altar or capital of this description is frequently represented.

The next building is the tomb of Theron at Agrigentum, a strange mixture of the two orders, as Ionic columns with their capitals are surmounted by a Doric entablature. There is no reason to doubt the antiquity of this monument, or the truth of the appellation which it has received. Theron died in the seventy-seventh Olympiad; eighty years afterwards, Hannibal, in order to facilitate the approach of the Carthaginian army, ordered the tombs situated without the walls of the city to be destroyed: that of Theron being struck by lightning, was spared by the besiegers. The building in

[1] Herod. lib. iii. c. 60. Pococke's Travels, vol. iii. book i. ch. 7. Tournefort, t. i. lett. 10. Choiseul Gouffier. This interesting ruin, although often visited, has never received any architectural elucidation. From its proximity to the sea shore it is much to be feared that a great proportion of the materials has been removed for various purposes: nevertheless the accretion of sand and earth about the site of the temple is very considerable, and there is little doubt that a judicious excavation would be repaid by interesting discoveries.

question is placed on that side of the town where alone it is accessible to a hostile force[1].

The octastyle temple of Bacchus at Teos is a heap of ruins, but enough remains to attest the exquisite beauty of the ancient edifice, and fully to justify the praises lavished by Vitruvius on the architect, Hermogenes of Alabanda. This artist seems to have effected a considerable change in the taste of his age, by maintaining, with some others of equal merit, that the Doric order was unfit for temples. He was so deeply impressed with the truth of this notion, that he is said to have exchanged the materials which had been prepared for the construction of the Teian temple, in order that he might be enabled to complete the work in the Ionic style. This splendid edifice was probably raised soon after the Persian invasion, for Xerxes destroyed all the sacred buildings of the Ionian cities, with the exception of Ephesus[2]; and as Hermogenes invented the pseudodipteral species of temple, he could not have flourished later than the eighty-eighth Olympiad, when other buildings of this kind are known to have existed[3].

It is difficult to ascertain the age of the double temple at Athens. From the earliest times a building dedicated to Minerva-Polias and to Erectheus, appears to have been an object of the highest veneration among the Athenians. It is probable, that in some cases the more modern edifice may have been confounded with that by which it was preceded.

[1] Diod. Sic. lib. xi. 53. xiii. 86. Antiq. of Magna Graecia. c. 3.
Strabo. lib. xiv. p. 910. ed. Oxon.

[3] Vitruv. lib. iii. c. 2. iv. c. 3. Ionian Antiq. vol. i. c. 1.

The ancient temple was to a certain extent destroyed by Xerxes, and we are not informed that the present building was restored by Pericles. Xenophon mentions the destruction of the old temple of Minerva by fire in the ninety-third Olympiad, from which period to the conclusion of the Peloponnesian war we have the time requisite for the completion of the new structure[1]. This agrees sufficiently with the very curious architectural inscription brought from Athens by Dr. Chandler, which describes the unfinished state of the temple, and gives the measurement of its various members[2]. Whatever be the precise date of its erection, it will for ever be considered as the most perfect specimen of the style in which it is constructed; and being fortunately preserved nearly entire, may serve as a model for the study and imitation of all future artists.

The superb temple of Apollo-Didymaeus, near Miletus, it is reasonable to suppose, was not built before the hundredth Olympiad. The architects, according to Vitruvius, were Peonius of Ephesus, and Daphnis of Miletus; and as the first of these is said to have finished the celebrated temple of Diana, which was destroyed on the night of the birth of

[1] Hellen. lib. i. c. 6. Stuart's Athens, vol. ii. c. 2.

[2] That this interesting document relates to the building in question it is impossible to doubt: its form is too peculiar to be mistaken. The shape of the letters and general orthography are apparently much more ancient than the date abovementioned, but this probably arises from an affectation of archaism, not unfrequent among the Athenians. It is observable on their coins, especially the tetradrachms; and in many inscriptions which have been discovered in that country. A remarkable instance of archaic language is to be seen on a marble in the museum of the Earl of Elgin, containing an epitaph on the Athenian soldiers who fell at the siege of Potidaea.

Alexander, we are enabled to fix its real age with considerable accuracy. Three columns entire, and a profusion of marble fragments scattered around, are all that remains of this once magnificent edifice; but these are of a description amply sufficient to indicate its former beauty and grandeur, even if they had not been so highly extolled by the uniform voice of antiquity[1].

No doubt is left of the origin of the temple at Priene, as the dedication of the building to Minerva-Polias by Alexander of Macedon, remains inscribed on a fragment of the walls. The architect was Pytheus, or, as he is sometimes called, Phileos: he joined with Hermogenes in his proscription of the Doric style[2].

From this period to the Roman conquest we have no existing specimens of the order, at least none of which the age is in any degree certain. Little architectural information can be collected from the scattered vestiges of the Ionic temple of the Syrian goddess at Hierapolis, built by Seleucus; for, although extensive, they furnish no specimens of former beauty and magnificence[3].

The remains of a grand and most imposing edifice are to be seen at Sardis. It has been rarely visited, and, as far as I know, never described. Five entire columns are situated on the banks of the Pactolus; and the materials of the whole building are heaped around. The diameter of the columns is not less than six feet, from which some notion may be

[1] Strab. lib. xiv. p. 634. Pausan. Ach. c. 5. Ionian Antiq. vol. i. c. 3.

[2] Vitruv. lib. i. c. 1. Proëm. lib. vii.

[3] Lucian de Syr. Dea. 30. Pococke's Travels, vol. i. lib. ii. c. 18.

formed of the vast dimensions of this temple. It is difficult with any accuracy to fix its age, but, as Sardis was one of the twelve cities of Asia Minor restored by Tiberius after the dreadful earthquake which happened in his reign[1], and as the temple does not appear ever to have been entirely finished, it is probable that we ought to refer its erection to the era of that prince. At the same time it is to be observed, that the remains bear some marks of higher antiquity: the projection of the volutes, and other peculiarities, with the beauty of the architecture, seem to indicate the work of an earlier period.

The Corinthian order of architecture is comparatively of recent invention. A fanciful and ingenious story of its origin, related by Vitruvius, is well known; but unfortunately cannot be received as credible history: the tale is valuable, however, as affording an intimation of the date of its introduction; for Callimachus, who is said to have transferred the leaves of the acanthus from the tomb of the Corinthian virgin to the capitals of his columns, lived towards the end of the Peloponnesian war, and was the artist so celebrated as the author of the lamp preserved constantly burning in the temple of Minerva-Polias at Athens[2]. It is not altogether improbable that the characteristic ornament of the style may have been imported from Egypt: the flower of the lotus, which generally formed the decoration of the ponderous structures of that country, in some of its fantastic

[1] Strab. lib. xiii. p. 627.

[2] Vitruv. l. iv. c. 1. Pausan. Att. c. 26. Strab. l. ix. p. 396.

varieties bears a near resemblance to the ornaments of the Corinthian capital; and, as no great degree of intercourse and traffic prevailed between Greece and Egypt until the more recent period of their history, its late appearance in Europe is sufficiently accounted for.

The concluding years of the Peloponnesian war witnessed the first examples of the style in Greece: I believe, at least, that no notice occurs in ancient writers of its prior existence. The old temple of Minerva at Tegea was burnt down in the ninety-fourth Olympiad, and was rebuilt by the famous Scopas of Paros, who produced the largest, and according to Pausanias the most beautiful, building in the Peloponnesus. It was an hypaethral edifice, the interior of the cell was adorned by two rows of Doric columns surmounted by others of the Corinthian order. The peristyle was Ionic[1]. A few shattered fragments constitute the only remains of this once magnificent structure; but as the situation is precisely ascertained, the whole plan might easily be restored by an excavation judiciously directed.

The choragic monument of Lysicrates, well known by the appellation of the lanthorn of Demosthenes, was built,

[1] Pausan. Arcad. c. 45. We are here furnished with the correction of a mistake, into which the learned author of a work already quoted, has fallen, when he states, that the practice of placing different orders one above the other is not older than the theatres and amphitheatres of the Romans. Knight Anal. Inquiry, pt. ii. c. 2. 46. It is possible however that we ought to reverse the order in which Pausanias speaks of the exterior and interior columns; as it is more reasonable to suppose that the peristyle was Doric, and that the less massive orders were in the interior of the building. This is in some measure confirmed by the mode actually observed in the temple of Apollo near Phigalia, which is compared by Pausanias with that of Minerva at Tegea.

according to the narrative inscribed on the freize, in the hundred and eleventh Olympiad. This little edifice has suffered nothing from the many causes which have contributed to lay in ruins the noblest monuments of Athenian taste, but is still entire, and may perhaps be considered as the most exquisite and perfect specimen of the order[1]. It is probable that the singular building called the temple of the Winds is not of a date considerably later; it possesses some peculiarities which are not observable in more recent structures, and the formation of the roof, while it betrays an ignorance of the principle of the arch, proves, at the same time, in a remarkable manner the skill and ingenuity of the architect. It is mentioned both by Vitruvius and Varro as the work of Andronicus Cyrrhestes, but without any information respecting his age[2].

Many of the ornamented theatres, so numerous in Asia-Minor, were built, in all probability, considerably before the Roman conquest: that at Laodicea on the Lycus, and that at Patara on the coast of Lycia, are the most remarkable among those of the Corinthian order[3].

The temple of Jupiter Capitolinus at Rome was built by Domitian, out of the materials of some edifice at Athens which had been transported from that city; and this work is worthy of mention, both because its prior destination is probably to be referred to the period of which we are treating, and on account of the remark of Plutarch, who relates that the columns were cut and repolished after their

[1] Stuart's Athens, vol. i. c. 4.

[2] Vitruv. lib. i. c. 6. Varro de Re Rust. l. iii. c. 5.

[3] Pococke, vol. ii. Ionian Antiquit. vol. i.

arrival at Rome, in order to produce a greater degree of elegance and lightness, but that what they obtained in these qualities they lost in grandeur and symmetrical proportion[1].

The Roman conquest spread the Corinthian style throughout Greece, almost to the exclusion of the other orders. Although the buildings of this period are often more splendid and costly than those of preceding times, yet the pure taste and correct designs of the better ages of the art are generally wanting. From this remark, however, must be exempted some of the works of Hadrian, especially if the columns at Athens which are called by his name, and which are in reality the ruins of the temple of Jupiter Olympius, owe their origin to this Emperor. These display the utmost beauty and propriety, with perhaps the greatest degree of magnificence and grandeur, ever attained to by the architectural exertions of the emperors of the Roman world[2]. The remains of a dipteral temple with columns composed of the purest marble, more than six feet and a half in diameter, and sixty feet in height, cannot be described in any terms commensurate with the sensations excited by the view of the original[3].

[1] Plut. in vit. Publicol.

[2] These columns are perhaps the remains of that temple which, according to Vitruvius, was first projected by Pisistratus; the foundations of which were begun by the architects Antistates, Callaeschros, Antimachides and Porinos. Afterwards Cossutius, by birth a Roman, built the temple according to the design he made by command of Antiochus Epiphanes. This we learn from the same author, who further informs us that temple now built was of the Corinthian order, and of the kind termed dipteral. This account is perfectly consistent with the mode of arrangement preserved by the remaining columns, which proves it to have been a temple of that description. Whenever, or by whomsoever, finished these columns bear the indications of a pure age of Grecian art.

[3] Pausan. Att. 18. Vitruv. proëm. lib. vii. Stuart's Athens, vol. iii. c. 2.

Although these splendid remains have acquired an appellation to which they appear to have no just claim, it may be right here to ascribe to its real author an Athenian building, of the Corinthian order, which possesses all the characteristics of the age of this munificent prince, but to which Stuart has erroneously attributed a Grecian origin. From his authority it has generally been called the Poikile Stoa; but when we observe the appearance of the whole work, the columns placed on pedestals, the foliage of the capitals, the angles of the abacus, the epistylia composed of two fasciae, all corresponding with the Roman practice, and more particularly with the gate of Hadrian in the same city, authenticated by the inscription which it bears, there is no reason to entertain any doubt of its real date and origin. In truth Pausanias, in his description, seems clearly to allude to a striking peculiarity of this building; by which it appears to have been a kind of atrium, surrounded by a portico open to the interior, enclosing a museum, or building, for the reception of statues and pictures[1].

Having shortly enumerated the most striking vestiges of Grecian architecture, and having indicated the sources from whence an accurate knowledge of all their details may be derived, it is scarcely necessary even to allude to what has indeed been called the Tuscan style, but which, in fact, seems merely to have been a corrupt imitation of the Doric: nor is

[1] Pausan. Att. 18. *πεποίηνται δὲ καὶ ταῖς στοαῖς κατὰ τὰ αὐτὰ οἱ τοῖχοι.* The appearance of the ruin fully explains this passage.

Compare this building given by Stuart, vol. i. c. 5. with the arch of Hadrian, vol. iii. c. 3.

it more desirable to describe at length that barbarous mixture which prevailed in the later ages of the Roman empire, and which is known by the name of the Composite order. The practice of the Greeks was confined to the three species which have already been mentioned; and it is observable that the most perfect example of each kind is to be found within the walls of the same city. The narrow lanes and wretched hovels which compose modern Athens, are still ennobled by the most unequivocal proofs of the glories of ancient art. The majestic grandeur of the Parthenon, the chaste elegance of the Erectheum, and the beautiful and splendid decoration of the choragic monument, and of the columns of Adrian, are alike unrivalled in their several characters of varied excellence.

We ought not, in any view, however cursory, of the ornamental buildings of the Greeks, to abstain from all notice of an invention by which the representation of human figures is substituted for columns, in the support of an entablature. This use of Cariatides, as they are called, although known in the best ages of the architecture of Greece, does not seem ever to have been very general, or even favoured in that country. Their name and origin have been traced; but it is not probable that the story of the Carian women is entitled to more credit than the idle traditions to be met with respecting the different Grecian orders[1]. It is not unlikely that they may have been derived from an Egyptian source; as in that country columns are

[1] Vitruv. lib. vi. c. 10.

frequently to be seen with the representation of female heads by way of capitals; and in the Memnonium at Thebes the epistylia are supported by figures of men instead of columns[1]. However this species of ornament may have arisen, it has been so rarely practised in Greece, that I believe the list afforded us by ancient writers may be comprised in two examples. The first is the Persian portico at Sparta, an edifice much celebrated in ancient times, and which, it is likely, was one of the earliest specimens of the style. It is now to all appearance utterly destroyed, and it is even difficult to fix the precise spot on which it stood: could this be accomplished, there is little doubt that considerable remains might speedily be discovered, for the frequency of earthquakes at Sparta makes it probable that the portico has been thrown down by one of these convulsions rather than by the effect of time; and the rapid accumulation of the fine alluvial soil that forms the valley of the Eurotas, would effectually protect from external injury the interesting fragments which it covered. The building was erected shortly after the defeat of Xerxes, and the architrave was upheld by sculptured figures habited in the loose drapery and flowing robes of the Asiatics: among them were the portraits of individuals, for those of Gobryas and Mardonius are particularly mentioned[2].

[1] Denon Voy. d'Egypte, pl. 42. 61.

[2] Pausan. Lacon. 11. It is not certain how these figures were disposed, but it is probable that they formed a kind of second order, and were placed over the columns of the building. The words of Pausanias seem to imply this—εἰσὶ δὲ ἐπὶ τῶν κιόνων Πέρσαι, λίθου λευκοῦ—. The portico may therefore have resembled an edifice at

A portico of the Pandroseum at Athens furnishes an instance of the representation of female figures supporting an entablature, and is so beautiful as almost to justify what may perhaps be considered as a capricious deviation from established taste. The date of this elegant structure must, beyond all doubt, be deemed coëval with that of the double temple of Minerva-Polias and Pandrosus to which it is annexed[1].

It is not at present my intention, in addition to these remarks on the temples of the Greeks, to pursue and to note the gradual changes and variations in the different species of their ornamental architecture—their theatres—their forums—their public baths and private dwellings; although each of these topics furnishes matter for much curious investigation. It remains, however, to attempt briefly to ascertain the age and origin of the use of the arch, an invention which was calculated to produce the greatest revolution in the practice of architecture at the period of its adoption, and which, from its many advantages, has been universally preserved and admired in modern times. After submitting this subject to a good deal of inquiry and reflection, it appears most probable that the era of the Macedonian conquest nearly coincides with that of the first introduction of this remarkable feature of Grecian architecture. Much has been written to prove that the use of the arch was not only familiar to the earliest artists of

Thessalonica, still remaining in part, and described by Stuart (Athens, vol. iii. c. 9.) This edifice, indeed, ought perhaps to be added to the examples mentioned in the text, although its date is of questionable authority.

[1] Pausan. Att. 21. Stuart's Athens, vol. ii. c. 2.

Greece, but was even to be traced throughout the yet more ancient monuments of Egyptian labour. In adducing this proof, the most obvious mistakes and the grossest blunders have been committed : drawings and engravings of the actual remains of the antiquities of these countries have been referred to, and the wretched cabins of the Arabs, and the towers and steeples of the modern Greeks, have been gravely represented by some, as forming part of the ancient temples, among which these fabrics are frequently to be discovered. The selection of those travellers whose accounts are to be received, has not always been judicious; to the authority of such writers as Paul Lucas, and some others of his nation, no particle of credit is due: his truth and accuracy are declared by a recent traveller, his countryman, to be only worthy of comparison with the Arabian Nights Entertainments[1]. In like manner, the assertions contained in works of late date, composed under the Roman empire, have been implicitly adopted respecting the nature of buildings which either never had any existence at all, or which had been utterly destroyed long previous to the times in which their pretended descriptions were published. The tales of the hanging gardens of Babylon, of the labyrinths of Crete, of Lemnos, and of Porsenna, are equally fallacious and incredible. Strabo and Pliny, who undertake to detail the wonders of these edifices, had no other object in view than to convey the notion of vast and stupendous works; the display of arches and of domes was best calculated in their

[1] Chateaubriand, Itineraire, pref.

own day to produce this effect, and accordingly they did not hesitate abundantly to employ these forms in the account of buildings which no one had ever seen[1].

In considering this question, it is necessary to keep in mind the difference between an arch constructed of wedge-formed stones whose joints, if prolonged, would meet in a centre, and one produced merely by the gradual projection of horizontal courses of stones until they meet: of this inartificial description I believe examples may be found in all ages; but as abundant materials and massive proportions are required in its formation, little was gained by the adoption of this method, and it is therefore rarely seen. With respect to the arch scientifically constructed, we may safely assert that no specimen is to be met with before the age of Alexander, either in the existing remains of art in Greece, or described in the works of those writers who flourished previously to that period. The words ΑΨΙΣ, ΨΑΛΙΣ, ΘΟΛΟΣ, which unquestionably in later times almost invariably implied arch, or dome, are used in a different sense by the more ancient authors. Thus in Homer ἁψὶς is simply the connection of threads (ἅπτω, necto,) and there, signifies the meshes of a net[2]. Herodotus in relating the method by which the horses and their riders, sacrificed at the funerals of the Scythian kings, were suspended in the air, informs us that two curved pieces of wood passed under the belly of the dead horse, and were fixed at each end to

[1] Strab. lib. xvi. Plin. lib. xxxvi. c. 13. Herodotus, who not only saw, but minutely described, the Egyptian labyrinth, the model of all works of this kind, sufficiently proves that it was built without any arch, lib. ii. c. 148.

[2] Il. v. 404.

the top of a pole erected in the ground for that purpose. These pieces of wood he calls αψιδες[1]. Similar to this is the meaning of the word as employed by Euripides to denote the wheel of a chariot, or more properly its circumference[2].

ΨΑΛΙΣ in the recent ages of Greek literature was synonimous with ΑΨΙΣ; but the word is rarely to be met with in the works of the earlier writers. In a fragment of Sophocles[3], and by Plato[4], it is used in mentioning a subterranean edifice. What it anciently signified as a term in building is very uncertain, but if we might conjecture from its primitive meaning, forfex, shears or scissars, it is difficult to imagine how any thing descriptive of this instrument should enter into the formation of an arch.

ΘΟΛΟΣ, which is interpreted dome, or cupola, implied before the Macedonian conquest, merely a circular edifice, without any reference to the nature of the roof[5]: this was so far from being necessarily arched, that there is, on the contrary, sufficient reason to believe it was in general of a very different construction. The derivative from θόλος, employed to express the pointed caps or bonnets worn by the Greeks, serves to strengthen this belief[6]: it is thus

[1] Melpom. lxxii. [2] Hippol. 1233.

[3] Lacaenae, quoted by Pollux. lib. ix.

[4] De legibus, lib. xii. There can be little doubt that the true reading is ψαλίδα, and not αψιδα. The passage is thus cited by Suidas (in ψαλ). See also Pollux. lib. ix. 49. ed. Hemst: where in the notes other reasons are produced. I learn from Mr. Gaisford that ψαλίδα is the reading preserved in a MS. of the Leyden library which formerly belonged to Isaac Vossius. ψαλίδα is likewise the reading of the Scholiast published by Ruhnkenius.

[5] Suid. in loc.

[6] Θολία pileus in acutum desinens, vid. Stephan.

likewise explained by the old lexicographers[1]. The tholus mentioned by Homer, it is clear, could not have been vaulted, for the roof was supported by a large column in the centre[2]. At Athens and Epidaurus were buildings bearing this appellation; the first was an ancient edifice, in which the Prytanes were accustomed to meet, the other was the work of the celebrated Polycletus: they are both described by Pausanias, but in neither does he intimate the existence of any thing like an arch[3].

From what has been said, it is evident that we ought to hesitate in giving generally to these words the interpretation of late writers; and where they occur in more ancient works, all notion of a scientific arch is to be withheld, unless the term itself be accompanied by such circumstances as are sufficient to indicate the principle of its construction. It has already been asserted that no such indication is to be found in any author previous to the hundred and twelfth Olympiad; and when, in addition to this fact, among the various architectural remains in Greece, we discover no vestige of such a mode of building anterior to the same date, the question seems to be nearly determined.

It is difficult to give a conclusive reason for adopting the age of Alexander the Great in preference to a still later period[4], as that which gave birth to the invention of the

[1] Hesych. in loc. οἶκος εἰς ὀξυ ἀπολήγουσαν ἔχων τὴν ϛέγην κατεσκευασμένος.

[2] Od. xxii. 456.

[3] Pausan. Att. c. 5. Cor. c. 27.

[4] There is indeed a passage in Aristotle, that would, if it were genuine, compel us to assign a period at least as remote as the reign of this prince; for the principle

arch: on the whole, however, it is not improbable that it may have originated about this time: the advances of science had been rapid and extensive, and a new world was then opened to Grecian inquiry and research; for it is to the East that we are to look for the first authors of this style. In truth, the scientific principle of the arch was likely to have remained long unknown in Greece, where stone and marble were found in such abundance. When height was indispensable, it was obtained from the earliest times in that country, by the gradual approximation of stones placed horizontally each over the other; but as this method, from the ponderous masses necessarily employed, was attended with great labour and expence, it was, as already stated, rarely practised. In districts in which large blocks of stone were with difficulty procured, as in many of the fertile and extensive plains of the East, the invention of the arch would probably arise from the mere necessity of the case, in the use of such materials as were to be obtained; and in such situations, was of the highest value. We cannot however wonder that a discovery, so powerfully recommended by its character of utility, convenience and cheapness, should, when once known, have been speedily adopted throughout

of the arch being held together by the key-stone is expressly mentioned, and is made the subject of comparison with the government of the universe by the Supreme Being. It is sufficient however to state, that the passage occurs in the treatise 'de Mundo.' Concerning the genuineness of this work, in the ages immediately succeeding the restoration of literature, there was much difference of opinion; but the dispute is now set at rest to the satisfaction of every Greek scholar; of which I will evince my conviction by abstaining from the production of any one of those proofs by which the composition might be shewn to be spurious. Aristot. περὶ Κόσμου. c. 6.

the civilized world. How far these advantages may have contributed to the employment of the arch in situations to which it was ill suited, and indeed inapplicable, it is not necessary to inquire—perhaps we may doubt whether a very material addition has been made to the ornamental architecture of the Greeks by its introduction: few will deny that its abuse has perpetuated a greater corruption of style, and a more truly vitiated taste, than would probably have been witnessed had it never existed.

NOTE. PAGE XXX.

Since hazarding the conjecture in the text, I have met with a passage in Strabo by which it is in great measure confirmed. He there states that the expression of Homer, the ΛΑΪΝΟΣ ΟΥΔΟΣ, was construed to signify a subterranean treasury at Delphi, and not the temple of Apollo. Lib. ix. p. 421. *ἀφήτορος δ'ἐδὸν, τὸν κατὰ γῆς θησαυρισμὸν, κ. τ. λ.*

NOTE. PAGE LX.

From Herodotus it would appear that Darius, and not Xerxes, destroyed the Ionian temples in consequence of the revolt of Histieus, lib. vi. c. 32. This author makes no mention of the temple of Ephesus, but states that the temple of Juno at Samos was spared in consideration of the conduct of the Samian fleet at the battle of Lada, lib. vi. c. 25. Although the authority of Strabo is highly respectable, perhaps the account of Herodotus is more probable; it is certainly more consistent with the situation of the Ionian states during the reign of these princes.

THE

# CIVIL ARCHITECTURE

OF

# VITRUVIUS.

## SECTION I.

THE

# CIVIL ARCHITECTURE

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## SECTION I.

### CHAP. I.

#### OF THE COMPOSITION AND SYMMETRY OF TEMPLES.

The several parts which constitute a temple ought to be subject to the laws of symmetry; the principles of which should be familiar to all who profess the science of architecture. Symmetry results from proportion, which, in the Greek language, is termed analogy. Proportion is the commensuration of the various constituent parts with the whole; in the existence of which symmetry is found to consist. For no building can possess the attributes of composition in which symmetry and proportion are disregarded; nor unless there exists that perfect conformation of parts which may be observed in a well formed human being.

Nature, in the composition of the human frame, has so ordained that the face, from the chin to the highest point of the forehead whence the hair begins, is a tenth part of the whole stature; the same proportion obtains in the hand, measured from the wrist to the extremity of the middle finger. The head, from the chin to the top of the scalp, is an eighth, and as much from the bottom of the neck. A sixth part is given to the distance from above the chest to the highest point of the forehead; and from the same point to the top of the scull is a fourth of the whole stature. If the length of the face, from the chin to the roots of the hair, be divided into three equal parts, the first division determines the place of the nostrils; the second the point where the eyebrows meet.

The foot is a sixth part of the height of the entire frame; the cubit and the chest are each a fourth. The other members have certain affinities which were always observed by the most celebrated of the ancient painters and sculptors, and we must look for them in those productions which have excited universal admiration. In like manner the component parts of sacred edifices ought to be commensurate with each other, and have an appropriate relation with the whole structure.

The navel is naturally the central point of the human body; for if a man should lie on his back with his arms and legs extended, the periphery of the circle which may be described about him, with the navel for its centre, would touch the extremities of his hands and feet. The same affinities obtain if we apply a square to the human figure; for, like the contiguous sides, the height from the feet to the top of the head is found to be the same as the distance from the extremity of one hand to the other, when the arms are extended. Since therefore the human frame appears to have been formed with such propriety that the several members are commensurate with the whole, the artists of antiquity must be allowed to have followed the dictates of a judgment the most rational when, transferring to the works of art principles derived from nature, every part was so regulated as to bear a just proportion to the whole. Now although these principles were universally acted upon, yet they were more particularly attended to in the construction of temples and sacred edifices; the beauties or defects of which were destined to remain as a perpetual testimony of their skill or of their inability.

The standards, according to which all admeasurements are wont to be made, are likewise deduced from the members of the body: such as the digit, the palm, the foot, and the cubit; all of which are subdivided by the perfect number, which the Greeks call *teleios.* The perfect number amongst the ancients was thought to be ten, because ten is the number of the fingers. The palm was formed from the digit, and the foot from the palm. But since nature has given the number ten to the fingers of both hands, Plato, for this reason, esteemed that number perfect; because it is made up of units, which the Greeks call *monads;* which when they are made eleven or twelve are no longer perfect, inasmuch as they are excessive, nor can they be so until another decade is completed; for individual things form the particles of that number.

Mathematicians, on the contrary, contend that six is the perfect number; because, according to their ideas, it has aliquot parts whose sum amounts to that number: thus the sextans is one, the triens two, the semis three. The bessis, which is called *dimoiros,* is four; the quintarius, termed also *pentamoiros,* is five; and the perfect six. Proceeding upwards the *ephectos* is made by the addition of a sixth; eight, which is formed by the addition of a third, is the tertiarius, called *epitritos;* nine, which is made by the addition of the half, is the sesquialter, called *hemiolios;* the decade, constituted by the addition of two-thirds, is the besalter, termed *epidimoiros;* eleven, which results from adding five, is the quintarius alter, or *epipentamoiros;* twelve, which is the double of the simple number, is called *diplasion.* Moreover, reasoning from the proportions of the human figure, six appeared to them to be the most perfect number; for the foot is contained six times in the height of the whole stature; the cubit is six times the length of the palm, and twenty-four times that of the digit.

In conformity with the division of the cubit, which contains six palms, the cities of Greece appear to have divided the drachma into six parts; and it is equivalent to six pieces of brass called oboli, which are stamped like the Roman as: and the quadrant of the obolus, which some call dichalcos, and others trichalcos, bears the same relation to the drachma that the digit does to the cubit.

The Romans, however, preferred the ancient number ten, and made the denarius equivalent to ten asses; and it retains its ancient name to this day. Its fourth part, equal to two asses and an half, they called sestertius. In process of time being led to consider both ten and six as perfect numbers, they formed a more perfect number by combining the two. From this number, sixteen, the divisions of the foot arose; for, by taking two palms from the cubit, there remained for the foot four palms of four digits each. Hence, the denarius was made to contain as many brass asses as the foot contained digits.

If it be true, therefore, that the decennary notation was suggested by the members of man, and that the laws of proportion arose from the relative measures existing between certain parts of each member and the whole body, it will follow that those are entitled to our commendation, who, in building temples to their deities, proportioned the edifices so that the several parts of them might be commensurate with the whole.

Temples have various denominations, which are determined by their outward forms; the first of these is the temple in antis, or, as it is termed by the Greeks, *naos en parastasin*. Then follow the prostyle, amphiprostyle, peripteral, pseudodipteral, dipteral and hypaethral; the characters of which are thus distinguished. A temple is said to be in antis when the walls surrounding the cella are terminated in front by antae, between which two columns are placed. Over these a fastigium is constructed the whole extent of the front, according to the rules which are explained in a subsequent chapter of this book. There is an example of this in one of the three temples dedicated to Fortune, which is nearest the Porta Collina.

A prostyle temple has all the appendages of a temple in antis; but columns are placed at the angles in front of the antae. An entablature, similar to that of the temple in antis, is constructed in front and returned over the interval in each flank. The temple of Jupiter and Faunus, in the island of the Tyber, affords an example of a temple of this description.

An amphiprostyle temple has all the characters of the prostyle; besides which it has a portico in the rear similar to the one in front.

A peripteral temple has six columns in the front and rear; and eleven in the flanks, including those at the angles: these are so situated that between them and the walls a space, equal to the width of an intercolumniation, is left for an ambulatory around the cella. Instances of temples of this kind occur in the temple of Jupiter Stator, built by Hermodus in the portico of Metellus; and in the temple dedicated by Mutius to Honor and Virtue in the portico of Marcellus, which was built without a posticus.

A pseudodipteral temple has eight columns in the fronts and fifteen in the flanks, including those placed at the angles; the walls of the cella range with the columns which are the third in order from the angles of the fronts; so that between the walls and the peristyle there is a space equal in width to two intercolumniations and one diameter of the columns. There is no example of a temple of this kind at Rome, but at Magnesia there is one dedicated to Diana, which was built by Hermogenes of Alabandus, and another to Apollo, built by Mnestes.

A dipteral temple is octostyle in the pronaos and posticus, and it has a double range of columns around the walls of the cella. This mode of construction has been adopted in the Doric temple of Quirinus; and in the Ionic temple of Diana at Ephesus, built by Ctesiphon.

An hypaethral temple has ten columns in the pronaos and posticus; in all other respects it is similar to the dipteral. Within the temple there is a double tier of columns on each side, detached from the walls: the middle area is without any covering, open to the sky, and the cella is approached as well through the posticus as the pronaos. There is no temple of this description at Rome, but there is one at Athens, within the city[1], dedicated to Jupiter Olympius[2].

[1] No disputed passage of any author has given rise to more discussion than the concluding part of this illustration. The readings afforded by the different manuscripts are various, and have tended much to embarrass the subject. Some of them give the passage as follows, "Sed Athenis octastylos in templo Jovis Olympii." In two belonging to the British Museum, the word "*Iovis*" is omitted; one of them reads, "Sed Athenis octastylos in templo Olympio," and the other differs from it in having the word *et* for *in*. In the MS. to which Rhode, the editor of the Berlin edition, obtained access, it is similar to the last. In all those inspected by Stuart, the celebrated author of the *Antiquities of Athens*, the word *Iovis*, is likewise wanted.

The greatest difficulty, however, arises from the introduction of the word *octastylos*, which the context manifestly proves to be a corruption, unless we could admit that Vitruvius who, in enumerating the various kinds of temples, illustrates his explanation by alluding to existing monuments exactly in point, should, in the present instance, refer us to a temple wherein the principles of construction are so dissimilar to those which he has just informed us were necessary in hypaethral temples.

The inconsistency which results from the admission of this word, has been felt by all the commentators, who have attempted, in various ways, to restore the text and reconcile the passage with the context.

In a former work (Antiquities of Magna Graecia, Introd. p. iii.) I have offered some observations upon the passage in question; and, as the simplest mode of restoring the sense and reconciling it with the fact that a temple of Jupiter

Olympius at Athens formerly existed, and still exists in part, which, as the beginning of the passage leads us to expect of the temple subsequently alluded to, had ten columns in the fronts, I conjectured the word *octastylos* to have been interpolated. But having since found it to occur in all the manuscripts, it becomes necessary to admit that a word, or words made up of characters nearly similar, was originally introduced.

In order to discuss the question fairly, we ought to consider it in the form it assumes in the majority of the manuscripts, and omit altogether the word *Jovis:* the change of *et* for *in* is scarcely worthy of attention.

For *octastylosin*, I propose reading, *inastyIovis;* the passage will then read as follows, " Sed Athenis in asty Jovis templo Olympio." Here it ought to be observed of the expression *in asty*, that Vitruvius makes use of it in the proëm to the seventh book, where he is speaking of this very temple, " In asty vero Jovem Olympium......" Again in the third chapter of the eighth book, wherein he alludes to the springs at Athens, he says, " Haec maximè considerantur Athenis......et *in asty* et ad portum Piraeeum." On the other hand, when he alludes to the temples upon the acropolis, he subjoins the words *in arce*, to denote their situation: as in the seventh chapter of the fourth book, and in the proëm to the seventh.

By retaining the word *octastylos*, many have been led to imagine that Vitruvius referred his readers to an octastyle temple at Athens. Stuart, whose knowledge of Grecian architecture entitles his opinion on subjects of this kind to be received with all possible deference, supposes him to allude to the Parthenon, conceiving this to have been an hypaethral temple. He was induced to form this opinion from the description given of the temple by Wheler, before the operations of the siege of Athens by the Venetians had reduced it to the state in which we now see it. The Parthenon, however, was not an hypaethral temple, as I shall have occasion to remark in a future publication, wherein I propose to treat, at some length, on the subject of Athenian architecture. It will be sufficient in the present instance to record a dissent from the opinion formed by preceding travellers respecting the interior of the Parthenon; and to add that, even supposing it to have been hypaethral, Vitruvius could never mean to illustrate his precepts by referring to a building which was deficient in the two essential points by which such temples were distinguished—it was neither decastyle nor dipteral.

[2] The temple of Jupiter Olympius, we are informed by Vitruvius, in the proëm to the seventh book, was built by the Roman architect Cossutius, upon the site of one begun under Pisistratus, Antiochus being at the expence of its construction. The magnificent remains of this temple justify the eulogiums bestowed upon the entire building by our author, who ranks it among the four most celebrated temples of antiquity.

## CHAP. II.

### OF THE FIVE SPECIES OF TEMPLES.

There are five species of temples, namely, the pycnostyle, in which the columns are placed far apart; the systyle, in which they are more remote; the diastyle, whose columns are at an ample distance from each other; the araeostyle, in which the intervals between the columns are too great; and the eustyle, whose intercolumniations are justly proportioned.

In the pycnostyle species, the interval between the columns is equal to one diameter and an half; there is an instance of this in the temple of Julius, and another in the temple of Venus, which is erected in the forum of Caesar. In all temples of this species the same interval between the columns is observed. In the systyle species there should be an interval between the columns equal to two diameters; this arrangement would leave the space between the plinths of the bases of the columns equal to the extent of the plinths themselves. There are examples of this in the temple of Fortuna Equestris, near the stone theatre; and in some other temples, in the construction of which the same principle has been followed. Neither of these species ought to be generally adopted; for the matrons who go to their supplications, mutually supporting each other, cannot pass through the intercolumniations unless they separate and walk in ranks. The view of the entrance and of the statues themselves is also obstructed when the columns are placed so little apart; and the ambulatory, whose width is governed by the interval between the columns, is inconvenient from its being so narrow.

The intercolumniations of temples of the diastyle species may be as much as three times the diameter of the columns; as we find them in the temple of Apollo and Diana. One objection attends this disposition of the columns, since the epistylia are liable, from their great length, to break.

In the araeostyle species neither stone nor marble can be used for the epistylia, but beams of durable timber must be employed for that purpose. Temples of this species are made low and wide, and the fastigia are ornamented with earthen statues, or bronze sculpture gilt, after the Tuscan manner: this practice has been observed in the temple of Ceres and in that of Hercules built by Pompey, both in the Circus maximus; and also in a temple dedicated to this latter divinity in the Capitol.

The eustyle species remains to be described. This possesses, in the highest degree, the advantages of convenience, beauty and solidity. The intervals between the columns are made equal to two diameters and a quarter; excepting the central one, which, both in the pronaos and posticus, is enlarged to the width of three. This disposition produces a form of great beauty, and renders the entrance to the temple commodious: the ambulatory also around the cella now becomes sufficiently spacious.

The principles upon which temples of this species are constructed are these: if there are to be four columns in the front, the whole extent, exclusive of all projections beyond the shafts of the columns at the angles, must be divided into eleven parts and an half[1]: if the front is to consist of six columns, the extent should be divided into eighteen parts: and if the temple is intended to be octostyle in the fronts, the number of the divisions should be twenty four and an half. In all these cases one of the divisions is the standard, and measures the diameter of the columns. Each intercolumniation, that in the centre excepted, is made equal to two moduli and a quarter; the central interval alone, in both fronts, is equal to three. The height of the columns will be a certain multiple of the modulus[2]. There is no

[1] The MSS. state the number of the divisions to be ten and an half, when the temple is prostyle, with four columns in front. This is evidently an error of the copyists; for whilst the divisions of the hexastyle and octostyle fronts, as they are stated in the MSS. will allow of three diameters for the central intervals, and two and a quarter for all the others, the divisions of the tetrastyle front would only admit of a space equal to two diameters for the central intercolumniation; contrary to the practice, which Vitruvius has just before recommended, of enlarging the interval in the centre to the width of three diameters. It does not appear that the Greeks made any difference in the intervals between the columns of temples of the Ionic order; upon which particular order it is evident that Vitruvius is here treating: from which it might be inferred, that he had no Greek original in view when he determines the diameter of the columns from thus dividing the extent of the fronts. If however we divide the tetrastyle front of the portico of Minerva Polias at Athens into eleven parts and an half, each will be 2.10.8, which is very nearly the same as the diameter of the columns.

[2] In the various MSS. which I have examined, there is no mention made in this passage of the number of moduli which is to be given to the height of the columns. The passage stands thus, "Ipsarum columnarum altitudo modulorum habebunt justam rationem." From the want of concord in the number of the substantive and verb, the early editors of Vitruvius have been induced to believe that some other

example of a temple at Rome with these proportions, but at Teos, in Asia, there is one dedicated to Bacchus. These proportions were first introduced by Hermogenes, to whom we owe the invention of the octostyle pseudodipteral form. Having omitted the innermost range of columns in the peristyles of dipteral temples he diminished the number by thirty eight[1]; and thus reduced the labour and expence of building. By this expedient the ambulatory around the cella was rendered spacious, whilst the outward appearance of the temple remained unaltered: the grandeur of the structure was still preserved, and the eye was not conscious of the absence of the superfluous columns; for the introduction of the pteromata, and the disposition of the columns about the cella, were calculated to give that boldness to the design which results from the introduction of columns totally disengaged.

substantive was the antecedent to habebunt; and the passage, without any comment, has been altered in the following manner: "Ipsarum columnarum altitudo *erit modulorum octo et dimidiae moduli partis. Ita ex ea divisione intercolumnia, altitudinesque columnarum* habebunt justam rationem." This interpolation has tended to propagate an error, concerning the real height of the columns, into which the editors have been led, in a subsequent part of this chapter, which will be noticed hereafter.

[1] The commentators of Vitruvius have adopted various opinions in regard to the number of columns which were spared by this invention of Hermogenes. Newton supposes that the columns of the pronaos and posticus were included in the number omitted; the epistylia must then have extended from centre to centre of the antae; which cannot be thought to have been really the case. Probably the octostyle dipteral temples were constructed with a triple range in the front; this would admit of the omission of thirty eight when the inner ranges of the peristyles were taken away. The temple of Jupiter Capitolinus at Rome, and that of Jupiter Olympius at Athens, which were both dipteral, had a triple range in both fronts. But it is to be observed that these temples were hypaethral, and were entered both from the pronaos and posticus; whereas it appears from Vitruvius, that octostyle temples had only an entrance from the principal front.

It also provided that the peristyles should afford ample space for exercise to such as sought shelter from the sudden fall of rain. Such is the construction of temples which are pseudodipteral: from which we may infer, that Hermogenes considered with great care and attention the ends which his invention was intended to promote; and thus afforded a useful lesson, of which posterity may avail itself in its studies for the advancement of science.

The columns of temples whose species is the araeostyle, should be so proportioned that their diameter may be an eighth part of their height. In the diastyle species the height of the column is divided into eight parts and an half, one of which is given to the diameter.

The columns of temples of the systyle species should be divided into nine parts and an half, and one part given to the diameter. The diameter of columns in pycnostyle temples should be a tenth part of their height. But in the eustyle, as in the systyle species, the height of the columns should be made nine times their diameter and an half[1]: thus

[1] It is a very important point to ascertain the true height which Vitruvius intended should be given to the columns of eustyle temples: because, having preferred this species to all others for beauty and convenience, the proportions of a part so essential as the columns, is the first consideration to which our attention should be directed. The Elzevir and Berlin editions, as well as the translations of Newton and Perrault, make eustyle columns, like the diastyle, eight diameters and an half; thus it has happened that the proportions of the eustyle species, which, when properly represented, have obtained the preference of our author, have hitherto been misinterpretated. The reading however of various MSS. which in defiance of all other authority, can alone be admitted to convey the idea which Vitruvius entertained of the most perfect proportions, is at variance with the text of all the editors and translators. In those which I have had an opportunity of examining the passage stands as follows: “Aedibus araeostylis columnae sic sunt

the height of the columns will be properly proportioned to the intervals between them. The more the interval between the columns is increased, the greater ought to be the proportion of the diameter of the shafts to their height: for if the lower diameter of the columns, in temples of the araeostyle species, be made only one ninth or one tenth part of their height, the columns will appear weak and slender; because we estimate the bulk of the columns by comparing it with the void space between two: when therefore this latter is considerable, the apparent bulk of the shafts is comparatively small. On the other hand, if columns in the pycnostyle species were made an eighth part of their height, the comparative smallness of the intervals, by parity of reasoning, would contribute to their apparent bulk, and make them seem too massive. Hence it is that edifices constructed upon different principles require proportions peculiar to each. For a similar reason the columns at the angles of a building should have their diameter enlarged by a fiftieth part; because, from their situation, they are more immediately contrasted with the light; whence they appear less than the others. Thus the deception to which the sight

faciendae, uti crassitudines earum sint partis octavae ad altitudines. Item in diastylo demetienda est altitudo *columnae in partes octo et dimidiam, et unius partis columnae crassitudo collocetur. In systylo altitudo* dividatur in novem et dimidiam partem et ex iis una ad crassitudinem columnae detur. Item in pycnostylo dividenda est altitudo in partes decem, et ejus una pars facienda columnae crassitudo. Eustyli autem aedis columnae, UTI SYSTYLI, IN NOVEM PARTIBUS ALTITUDO DIVIDATUR ET DIMIDIAM PARTEM, ET EJUS UNA PARS . . . . . ." In one of the manuscripts the words in Italics are altogether omitted, which is evidently an error of the copyist, who has been misled by the recurrence of the word altitudo so immediately after its appearance in the passage alluding to the proportions of the diastyle species.

is liable, should be counteracted by means suggested by the faculty of reasoning.

The diminution of the shaft at the hypotrachelium is thus regulated. If the column be at the least fifteen feet high, the lower diameter of the shaft should be divided into six parts, and the upper diameter made equal to five of them. In columns from fifteen to twenty feet high the lower diameter should be divided into thirteen parts, eleven of which are to be given to the upper diameter. From twenty to thirty feet, the diameter of the columns should be divided into seven parts, and the diminution of the shaft made equal to one of them. The diameter of columns, whose height lies between thirty and forty feet, should be divided into fifteen parts, of which thirteen should be given to the upper diameter. And columns which are from forty to fifty feet in height, ought to be contracted at the hypotrachelium one eighth part of their diameter at the base. In columns of a greater height, the contraction at the top of the shaft should be proportionably less, because, to the eye, the diameter diminishes as the height of the columns increases; hence, to preserve the same apparent proportion of the diameters, it becomes necessary to increase that at the upper part of the shaft. The eye alone is the judge of beauty, and where a false impression is made upon it, through the natural defects of vision, we must correct the apparent want of harmony in the whole by instituting peculiar proportions in particular parts.

The method for giving the proper increase to the shaft towards the middle, which is termed *entasis*[1] by the Greeks, so as to render it gradual and easily applicable to practise, is explained by a figure at the end of this book.

[1] The entasis is the measure of the deviation from the straight line drawn from the extremities of the upper and lower diameters of the shafts.

## CHAP. III.

### OF THE FOUNDATIONS OF TEMPLES; AND OF IONIC COLUMNS AND THEIR APPENDAGES.

In preparing foundations for works of this kind, it will be first necessary to dig down to a regular stratum, if such is to be met with; and upon this the foundations, constructed with great attention to their strength, are to be laid: their solidity must be proportioned to the magnitude of the building in contemplation. The piers above ground, below the columns, should be thicker than the diameter of the columns they are to support by one half, that these substructures, which are called stereobatae, on account of their sustaining the whole weight, may be enabled by their greater solidity to support what is built upon them. The bases of the columns when fixed, ought not to project before the face of the stereobatae on either side. The intervals between the piers should either be made solid by means of piles, or arched over, so as to connect the piers.

If no compact stratum is to be found, but the ground, on the contrary, is loose or marshy to a great depth, trenches must be dug and piles of charred alder, olive, or oak, placed closely together, be driven in by means of machines. The intervals between them should be filled up with charred timber, and upon this substratum a foundation should be formed with solid masonry. The foundations being reared to the same level all around, the stylobate[1] is next to be constructed. Upon this the columns are to be arranged, in the manner already described, at intervals, which are determined by the species of temple intended to be built; whether pycnostyle, systyle, diastyle, or eustyle. In the araeostyle species we are at liberty to place the columns at any distance asunder.

In all peripteral temples, the number of the intervals between the columns in the flanks ought to be double that of the intercolumniations in the fronts: for then the length of the whole building will, in all instances, be double its width. Those temples in which the number of the columns in the flanks is double that observed in the fronts, have been built without any regard to this proportion, and they appear too long by one intercolumniation.

The number of steps in the fronts of temples should always be unequal; because if the first step, made in ascending, be taken with the right foot, that by which the

[1] Stylobatae and stylobatum are words used indiscriminately by our author, to express the whole uninterrupted basis below the columns. They mean a plane surface raised either upon a certain number of steps, which were continued all around, or upon a podium, which afforded no approach but in front. It does not appear that Vitruvius ever applied the word to mean the pedestals upon which we sometimes observe the columns of ancient buildings to be raised: nor is there any distinct mention made of pedestals throughout the whole work. That it has not this signification in this place, is evident from the construction of the passage, which is as follows: " Extructis autem fundamentis ad libramentum stylobatae sunt *collocandae*. Supra stylobatas columnae *disponendae*." If pedestals had been intended by the use of the word sylobatae, " disponendae" would have been used instead of " collocandae;" and vice versa.

level of the stylobate is gained, will also be taken with the same foot. The rise of the step ought not to exceed ten inches, nor be less than nine, in order that the ascent may not be too difficult: the width should be at the least a foot and a half, but ought never to exceed two feet. If steps be adopted on all sides, they should still observe the same proportions: but when a podium is to be constructed on three sides, the whole height, including the plinth, dye, corona and lysis[1], must not exceed the level of the stylobate. The stylobate ought not to be constructed upon the horizontal level, but should rise gradually from the ends towards the centre, so as to have there a small addition. The inconvenience, which might arise from a stylobate thus constructed, may be obviated by means of unequal scamilli[2]. If the line of

[1] Lysis, derived perhaps from the Greek *alusis,* a chain, or band. A kind of plinth or step above the cornice of the podium, which surrounds or embraces the stylobate; as we may observe in the temple of Fortuna Virilis.

[2] The use and application of the addition which we are directed to give to the middle of the stylobate, has been a subject of controversy with all the commentators on Vitruvius: and the position of the scamilli impares has produced many elaborate dissertations. Baldus, amongst others, has written upon it to a considerable extent; without producing any satisfactory elucidation. The object of our author in reducing every thing to the guidance of physical principles, is evident in various parts of his work; and may be traced throughout the whole of the present chapter; in which we are repeatedly directed to pursue certain measures calculated to counteract the supposed imperfections of vision.

The rule for making an addition to the stylobate was undoubtedly prompted by the same consideration. The image formed by the rays which pass through a convex lens from a straight line is not, like the object, straight, but somewhat curved; and is in fact part of a conic section. In like manner the image of a straight line, formed upon the retina, is curved, whether the line be vertical or horizontal. Owing to this defect of vision, if it may be so called, it might appear that the line of the stylobate would form a curved image; and be what Vitruvius terms, alveolated; that is, stylobate were perfectly horizontal, it would appear like the bed of a channel. The method of constructing the scamilli, and the application of them, is explained by a figure at the end of the book.

Having proceeded thus far, the next object is to fix the bases of the columns in the places assigned to them. Their

hollowed like the bed of a channel. Hence if we wish it to appear perfectly horizontal, we must make it to rise in the centre and fall gradually towards the extremities. Whether however it be that the line of the stylobate is interrupted, by being in some measure identified with the columns, and thus is only seen at intervals; or whether the eye becomes insensible, through habit, of the apparent curvature of objects which are presumed to be in reality straight, this great refinement, suggested by physical knowledge, does not appear to have entered into the execution of the works of the ancients.

In rearing the columns upon a stylobate thus constructed, we must have recourse to some expedient for placing them so that their axes may be perpendicular to the horizon. This object may be effected by the use of scamilli impares, or small plinths formed like wedges; placing them with the lower end towards the centre of the building. Scamilli of this description are adopted in the portico of Saint Martin's church; the stylobate of which is inclined towards the front for the purpose of carrying off the rain which occasionally falls upon it. These scamilli have their lower ends towards the pronaos, whereas those of Vitruvius have them towards the centre of the stylobate.

This explanation of what was meant by the addition to the stylobate, will apply to the passage alluding to the mode of placing the capitals of the columns upon the shafts. For the same reason that the line of the stylobate would appear concave, being below the eye, the line of the upper members of the epistylium would appear convex, being above it. To counteract this appearance it seems necessary to make the line of the epistylium concave towards the middle point; and the measure of the deviation from a straight line should bear a certain proportion to the addition made in the centre of the stylobate. The same inconvenience would arise, with regard to the capitals, as before offered itself in fixing the bases, which might be obviated by the use of similar scamilli. If the scamilli here used be all equal in size, it follows, that the abaci of the capitals will rise one above the other as they recede from the central point of the epistylium: and consequently the capitals will be in different horizontal planes.

height, including the plinth, should be half the diameter of the columns, and their projection, which the Greeks call the *ecphora,* a fourth; so that the width of the plinth may be equal to a diameter and a half. If the bases are to resemble the Athenian, their height is to be so divided that the members above the plinth may be a third of the diameter of the columns; what remains is given to the plinth. The first division is to be subdivided into four equal parts, one of which is for the upper torus; the remaining three are to be equally divided between the lower torus and the scotia, which the Greeks call *trochilos,* with its fillets. But if the bases are to resemble the Ionian, the proportions will be different; for the width of the plinth should be a diameter and three-eighths. The proportions for the height of the plinth, and the other members of the Athenian base, taken collectively, are to be observed in the Ionian; but the subdivisions of the latter must be made in a different manner; for the upper torus should be equal to three parts out of seven; two of the remaining four should be given to the upper trochilus, with its astragals and supercilium, and two to the lower trochilus. The lower trochilus will appear greater than the upper, because it is made to project to the face of the plinth. The astragals should be an eighth part of the trochilus.

The bases being fixed in their places, we must proceed to rear the columns of the pronaos and posticus; all of which, excepting those at the angles, should have their axes in a vertical line; but the columns at the angles, as well as those which are intended to be placed in the flanks, should have their axes inclined, so that the faces next the walls of the cella, may become perpendicular to the stylobate; and the whole contraction of the shaft is made to take place in the outward face. By observing this method in contracting the shafts, the whole temple will assume that form which accords with our ideas of perfection.

Having described the manner in which the shafts should be fixed, we proceed to treat of the method of forming the capitals; which, supposing them to be pulvinated, are to be constructed in the following manner. The abacus must every way be equal in extent to the lower diameter of the shaft and an eighteenth part: the height of the capital, including the volute, half this extent. A twelfth part of the abacus, measured from the angles of those faces which are to be ornamented with volutes, is to be taken, and from these points perpendicular lines, called catheti, are to be let fall. The whole height of the capital being divided into nine parts and a half, eight are given to the depth of the volute, and the remainder to the abacus. Then other lines are let fall, parallel to the catheti and distant from them one part and a half; and at those points where these lines are divided in such a manner as to leave four parts and a half above, and three parts and a half below, centres are assumed, from which circles are described, whose diameter is equal to one of the eight parts. These circles are called the eyes of the volutes, and diameters are drawn in them perpendicular to the catheti. The volutes are then described from centres in the several tetrants of these circles; beginning with those immediately below the abacus; and after every revolution through the four tetrants, when we again arrive at those below the abacus, the half spaces of the eyes are constantly made less. The height of the capital is so divided, that of the nine parts, three fall below the astragal at the top of the shaft; the space intervening between that and the abacus, is occupied by the cymatium and canal. The cymatium projects as much before the abacus as the side of the square circumscribing the eye of the volute. The greatest projection of the bands, encircling the swell of the volutes, is limited by an arc, described through the point of projection of the cymatium, whose centre is situated in the tetrant of the capital. The axes of the volutes should not be greater than the eye, and the volutes are channelled to the depth of a twelfth part of their width.

These proportions are calculated for the capitals of columns whose height does not exceed twenty-five feet[1]. When the columns are of greater height, the relative proportions of the capitals must be different: the abacus, for example, should every way be equal to the diameter of the column and a ninth part; for inasmuch as the higher columns diminish less in proportion, it becomes necessary to increase the proportions of the capitals, in order that they may preserve a consistent projection beyond the shafts. The geometrical method of constructing the volutes is explained by a diagram at the end of the book.

In placing the capitals upon the shafts of the columns, they are not to be arranged so that the abaci may be in the

[1] The printed copies read fifteen feet.

same horizontal level; but must follow the direction of the upper members of the epistylium; which will deviate from the straight line, drawn from the extreme points, in proportion to the addition given to the centre of the stylobate.

The proportional height of the epistylium is determined from the actual height of the columns; when these are from twelve to fifteen feet, the epistylium should be half the lower diameter. When the height of the columns is from fifteen to twenty feet it should be divided into thirteen parts, and one of them given to the epistylium. In columns which are from twenty to twenty-five feet, the height should be divided into twelve parts and a half, and the height of the epistylium made equal to one of such parts. The epistylia of columns, which are from twenty-five feet to thirty feet high, ought to be a twelfth part of their height. Thus the epistylia must observe a greater ratio to the height of the columns as these continue to increase in altitude. For vision is less distinct as the height of the object increases; because the rays have to pass through a greater body of air, and its powers becoming exhausted in proportion to the space through which it penetrates, a false idea of magnitude is impressed upon the sense; whence it follows that when buildings have colossal proportions, or when they are situated upon elevated spots, we must increase the scale of the proportions of the upper members.

The width of the epistylium, where it rests immediately upon the capital, should be equal to the upper diameter of the shaft; but at the top its width should be increased so as to equal the diameter at the base. The cymatium should be a seventh part of the height of the epistylium, and its projection the same. The epistylium, below the cymatium, is divided into twelve equal parts, three of which are given to the first fascia, four to the second, and five to the third, or upper, fascia.

The zophorus should be a fourth less in height than the epistylium; unless it be intended to enrich it with sculpture, in which case it should be a fourth part higher; in order that the sculpture may possess sufficient importance. The cymatium should be a seventh part of the zophorus, and its projection the same. Over the zophorus the denticulus is placed, equal in height to the middle fascia of the epistylium; and its projection is equal to its height: the interval between the denticuli, which amongst the Greeks is termed *metoche*, is determined by making the width of the denticuli half their height, and the spaces between them two thirds of their width. The cymatium of this member should be a sixth part of its height.

The corona with its cymatium, exclusive of the sima above it, ought together to be equal to the middle fascia of the epistylium; and its greatest projection before the face of the zophorus, should be equal to the distance between the zophorus to the highest point of the cymatium: and in general the best effect will result from making the projections of all the members equal to their height.

The height of the tympanum of the fastigium is determined by dividing the extent between the extreme points of the cymatium of the corona into nine parts; and making the vertex of the tympanum one of such parts above the corona. The face of the tympanum should be in the same vertical plane with the epistylium.

The coronae of the fastigium, exclusive of the simae, are equal in height to those above the denticulus. The simae, which the Greeks call *epitithides,* should be higher than the coronae by an eighth part. The acroteria, at the angles of the fastigium, should be reared to the height of the central point of the tympanum; and those at the vertex an eighth part more in height than the others.

All the members above the capitals of the columns, that is to say, the epistylia, zophorus, coronae, tympanum, fastigium and acroteria, ought to have an inclination towards the front, equal to a twelfth part of the height of each; for the rays which enter the eye from the upper parts of the building being of greater length than those from the lower, convey to the sense an impression that the object is reclining; when, therefore, an inclination forwards is given it in the manner here described, it will appear to be in a plane perpendicular to the horizon.

The flutings of the columns should be twenty-four in number; and the channels so formed, that when the vertex of a square touches any point in their concave surface, the sides of it may touch the angles of the fillets between the channels. The width of the fillets should be equal to the entasis of the shaft.

Lions heads are generally sculptured upon the simae in the flanks of temples; they should be so arranged that one may be immediately over the axis of every column; and others disposed at equal intervals between them, against the centre of every tile. Those over the columns should be perforated down to the channel which receives the rain water; and the others solid, in order that the water which is received into the gutters from the roof, having no means of escaping through them, may not incommode those who, in seeking shelter, are obliged to pass through the intervals between the columns. The water is discharged from the mouths of such heads only as are placed over the columns.

Having thus closed the relation of what appertains to the construction of Ionic temples, we proceed in the next book to explain the proportions which are peculiar to temples of the Doric and Corinthian orders of architecture.

# EXPLANATION OF THE PLATES

TO

# SECTION I.

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TO

## SECTION I.

The principles of civil architecture form no part of the discussion contained in the first and second books of Vitruvius. In the third, after giving some definitions, and making some observations upon the origin of numbers, he proceeds to relate the principles upon which temples were constructed; and the proportions observed in the Ionic order of architecture.

It is fortunate that the understanding of Plato's notions, or those of any other antient philosopher, upon the doctrine of numbers, is not necessary to the understanding of Vitruvius upon the science of architecture. The passage alluding to the ideas of Plato concerning the properties of the number ten, can scarcely be made intelligible to an English reader, because of the play in the original upon the words "perficitur," and "perfectus." Without entering, therefore, into a discussion, which would be uninteresting to the generality of readers, we shall proceed to consider the subject of the remaining part of the third book.

The information which Vitruvius details on the proportions of the several orders of architecture, does not appear to have been obtained by the investigation of buildings which were in existence at Rome during his age: but, on the contrary, to have been collected from writings, on that science, left by his predecessors. Of those which he enumerates, it appears that three only were productions of his countrymen. With the exception of a volume written by Fussitius, and two small tracts, one by Varro, and another by Publius Septimus, no work upon the science of architecture seems to have been known to our author. On the other hand, he confesses to have derived the greatest assistance from the writings of Grecian architects upon that subject. These he states to have been numerous, and acknowledges that they supplied him with the principal materials in the formation of his treatise. Hence it will not be thought extraordinary, that the various proportions he assigns to the different orders should correspond very nearly with those adopted in Grecian buildings: more particularly in the Ionic, upon which order the number of writings enumerated by him greatly exceeded the works upon the two remaining.

Opportunities are afforded to us of ascertaining the extent of his plagiarism, by the partial existence of monuments, the subjects of the very works whence he admits that he derived his knowledge of architectural proportions. Amongst these may be mentioned the temple of Minerva Polias and the Erectheum, upon the acropolis of Athens; the temple of Minerva, at Priene, and that of Bacchus at Teos. In investigating, therefore, his proportions for the Ionic order, we shall compare them with those which have been adopted in these buildings.

## PLATE I.

Fig. 1. Plan of a temple in antis.

Fig. 2. Plan of a prostyle temple.

Both temples are here represented with a podium around three sides; the fourth is approached by a flight of steps. The text of our author leaves us in doubt whether or not the columns *a a*, between the antae of the latter temple, were suffered to remain. If literally construed, a prostyle temple had only two columns more than a temple in antis; and these were placed opposite the antae in the direction of the walls. We cannot easily admit that such was his meaning, because the interval between the two columns in the front would have been too great to afford support to the epistylium. The prostyle temples of Neptune Erectheus and Minerva Polias, at Athens, had no columns intervening between the antae; but the intervals were enclosed, leaving openings only to give access to the cellae. These temples were without a pronaos, which those described by Vitruvius were intended to have.

## PLATE II.

Fig. 1. Plan of an amphiprostyle temple.

According to our author, amphiprostyle temples resembled the prostyle, with the addition of a portico in the back front. In the three species of temples already mentioned, the *aedes*, or temple exclusive of the porticoes, is divided in the manner described in the fourth chapter of the second section. The length being made equal to twice the width, the cella, including the wall which separates it from the pronaos, is a fourth part greater in length than the width of the temple.

Fig. 2. Plan of a peripteral temple.

We are to infer from the words of Vitruvius, that peripteral temples were constructed with an area, or posticus, in the back part, corresponding to the pronaos of the principal front; because amongst the examples of peripteral temples which he instances, one, deviating from the general plan, is stated to have been constructed without a posticus. The word posticus here has a different meaning from the same word, as it is introduced in the description of an amphiprostyle temple; where it signifies the portico at the back part of the temple. In the same manner the word pronaos is used in the description of Tuscan temples, to express the area occupied by the portico in front. The temple of Honor and Virtue is described as peripteral, that is, having insulated columns all around it; consequently there was a portico in the back front; and therefore when it is represented as having no posticus, we can only understand it to have been constructed without an opisthodomus beyond the cella.

The instructions for the division of the aedes, or temple exclusive of the peristyles, in the chapter referred to in the description of Fig. 1, cannot be said to apply to any other than temples which were not peripteral; otherwise if the length of the aedes is to be the double of the width only, it will not sufficiently occupy the length of the area, comprehended between the columns in the two fronts of the temple: unless, indeed, the space remaining be allotted to a posticus, of which however there is no mention in the chapter above alluded to.

## PLATE III.

### PLAN OF A DIPTERAL TEMPLE.

If the columns which are distinguished by the lighter shade be removed, the species of the temple becomes pseudodipteral. According to the arrangement of the columns in the plan before us, the number of columns requiring to be removed is thirty eight; in conformity with the text of Vitruvius. Since hypaethral temples alone had two approaches, it was perhaps the intention of the author to represent dipteral temples with a treble portico in that front only through which they were approached. It appears, from Dionysius of Halicarnassus, that a temple of Jupiter at Rome, like that erected to the same divinity at Athens, had a double range of columns in the flanks, and a treble range in both fronts: but these temples were hypaethral, and consequently were approached through both fronts; which, on that account, it might be necessary to make equally magnificent.

The temple of Bacchus at Teos, is said by our author to have been of the pseudodipteral species. In order, therefore, to give some idea of the magnitude of the temple, the diameter of the columns in the plate before us is made the same with that of some of the columns of this temple which are yet remaining.

## PLATE IV.

### PLAN OF AN HYPAETHRAL TEMPLE.

The proportions of the temple represented in this plate are similar to those which may be collected from Pliny's account of the temple of Diana at Ephesus. According to this author, Ionic bases and capitals were first introduced in the columns of that temple.

## PLATE V.

Fig. 1. Explanation of the mode in which the addition was made in the middle of the stylobate of a temple.

Although our author assigns no reason why a stylobate constructed upon a horizontal level would appear hollow, like the bed of a channel, yet it is evident that he thought an addition in the middle necessary to counteract some supposed imperfection of vision. A stylobate thus constructed would not permit the axes of columns placed upon it to be vertical, unless small plinths, higher at one end than the other, were first placed below the plinths of the bases; or the plinths themselves were made like wedges; the height gradually diminishing from one end to the other, so that their upper surfaces might be in horizontal planes. The line of the capitals of the columns ought not, we are told, to be horizontal, but the capitals so placed, that the deviation of every line of the entablature surmounting them from a straight line might correspond to the addition made in the centre of the stylobate.

We are left to conjecture in what manner this deviation is made to take place. If the columns be all equally high, it is evident that when placed upon the *scamilli,* the line of their capitals will be parallel to the line of the stylobate; but before we can admit that this was the meaning of Vitruvius, it becomes necessary to consider by what principle of optics he was guided, when he declared it necessary that an addition should be given to the middle of the stylobate. The principle, which it is probable he had in view, has already been noticed in the commentary upon the passage; to which the reader is referred.

Fig. 2. Profile of a column belonging to the pseudodipteral temple at Paestum.

This example is chosen as an instance in which the entasis, or swell, which Vitruvius directs us to give to the middle of the shaft, is very evident: it is here somewhat more than a nineteenth part of the lower diameter. If the fillet between the flutings of Ionic columns be the measure of the entasis of Vitruvius, the deviation from a straight line will be scarcely perceptible in the outline of a column. In fact, the entasis, like the addition to the stylobate, was merely intended to correct the apparent want of bulk in the middle which columns were supposed to have, if the shafts were made to diminish in a straight line from the bottom to the top. The temple from which this column is taken is the production of an age, when the pure taste of the Greeks had ceased to operate, and is here given only, because an extreme case sometimes serves to illustrate a meaning imperfectly understood.

## PLATE VI.

In proceeding to fix the shafts of the columns upon their bases, we are directed to make the axes of those at the angles as well as those in the flanks, incline so much towards the walls of the cella, that the uppermost point of the shaft, in the outward face of the columns, may deviate from a vertical line drawn from the bottom, by a space equal to the whole diminution, of the shaft: in other terms, to make the inward face of the shaft parallel to the walls of the cella. There is but one instance existing where such an inclination of the shafts of the columns is observed, which is the temple of the Sybil at Tivoli. We no where find it adopted in peripteral temples; and its existence in this building is not sufficient for inducing a belief that the practice was commonly adopted: for although the general effect of the temple is pleasing, it exhibits in its details such a depravity of taste as amounts to a conviction, that it was constructed during the decline of the arts in Italy. An inclination, although by no means so great, is observable in the engaged columns in the west front of the Erectheum at Athens; but its introduction arose from the propriety of making a fluted column, when inserted in the wall of the cella, somewhat more than half an entire column.

Fig. 1. A section through the lateral walls of a temple, having columns inserted in the same manner as those of the Erectheum. The reason for making the columns more than semifrusta seems evidently to have been, in order that the

flutings next the walls might be perfect. In this case it is necessary to incline the axes of the columns; for otherwise the portion of another flute will be apparent towards the upper part of the shaft.

Fig. 2. A diagram which explains that, according to the mode of reasoning adopted by Vitruvius, it becomes necessary to give an increase to the proportionate height of the epistylium, as the columns increase in height.

Vitruvius seems to have imagined that if objects, having the same proportions but different heights, were situated at the same distance from a spectator, the upper members of the larger would appear less in proportion than those of the smaller. To remedy this he proposes that an addition should be made to the upper members of the larger object; which virtually amounts to the proposition of measuring the apparent heights of objects by the angles they subtend at the eye. For if the arc A*d*, be to the arc *de*, in the ratio of the arc A*b* to the arc *bc*, DE will be to BC in a greater ratio than AD to AB; because the tangents increase in a greater ratio than the arcs. Thus by increasing the proportions of the epistylium we preserve the proportions of the angles they subtend at the eye; that is, according to the ideas of our author, of the apparent magnitudes.

If however we could, for a moment, admit that the apparent magnitudes of objects were measured by the angles they subtend at the eye, no addition would be necessary, unless both objects were placed at the same distance from the spectator. For, if the distance of the larger object were greater in proportion to its magnitude, the same proportional heights would be necessary in both.

But the apparent magnitudes are not measured by the angles they subtend, unless when objects are small. When they are considerable, the only means of estimating their heights are by carrying the axis of the eye uniformly from the base to the top.

Hence no additional height seems to be necessary; nor indeed was it the practice of the Greeks to make the entablatures of their larger temples greater in proportion to the diameter of the columns, than those of edifices of a less magnitude. For, although we find that different proportions obtain in the entablatures of buildings of different ages, yet in those which are nearly cotemporary they are universally the same. We may instance, in proof of this, the temples of Minerva and Theseus, and the Propyleum at Athens; and the temple of Minerva at Sunium.

It may be asked, how the adoption of such a principle can be consistent with the professions of our author, who avows that his proportions were taken from Grecian models? To which it might be answered, that it was probably suggested by the consideration of buildings erected in different ages.

In instituting a parallel between the Grecian Doric order and that of our author, we shall select three instances; in one of which the members are large, and in the others considerably less. The proportions of the several parts will be found to correspond in many instances with those laid down by Vitruvius: whence the inference seems to be, that having found the proportions to vary in buildings of different magnitudes, he was led to form a scale for the proportions of those whose magnitudes were between their limits; without taking into consideration the periods of their construction. We shall afterwards state the reasons for selecting the buildings to which we here allude in preference to the many others now remaining in Greece.

Fig. 3. Plan of part of the roof of a temple.

Byzes of Naxos is said, by Pausanias, to have first introduced the practice of carving the stone, with which the roofs of temples were covered, so as to represent tiles. This method has been observed in the roof of the tower of Andronicus Cyrrhestes at Athens. Vitruvius mentions this tower in the sixth chapter of the first book; for which reason the form of the tiles, and the manner of disposing them, are taken from that example.

## PLATE VII.

This plate exhibits a parallel between the Vitruvian Ionic column, represented by Fig. 1, and one of those of the temple of Bacchus at Teos. In order that the reader may more easily comprehend the deviations of one from the other, the diameters of both are supposed to be equal. Although the Vitruvian base is raised upon a plinth, the divisions of the members above it observe very nearly the same aliquot parts of the entire height as those of the Ionian column. In the latter, the torus differs rather more than $\frac{3}{100}$ths of an inch from three sevenths of the height of the base; which is the proportion it bears in the Vitruvian column. The division of the remainder, for the upper and lower trochilus, is into two equal parts, in conformity with the rule of Vitruvius. The projection of the step before the line of the shaft varies inconsiderably.

We have no data for ascertaining the original height of the columns of this Ionian temple. I therefore suppose the species of the temple to have been either eustyle or systyle, and consequently the height of the column, including the capital and base, to have been $9\frac{1}{2}$ diameters or 40.2.6. As the columns exceed 25 feet in height, the extent of the abacus of the capital is to be made equal to the lower diameter of the shaft and one ninth part, or 4.8.44; which exceeds the abacus of the other by 4.84 inches. But it is to be observed that, when the height of the column exceeded 40 feet, the upper diameter was to the lower in the ratio of 7 to 8: hence the upper diameter of the shaft ought to be 3.8.45; which is greater than the diameter of the other column, and consequently requires a greater extent of abacus.

The depth of the volute, according to Vitruvius, should be eight parts of the nineteen, into which the extent of the abacus is divided: this depth, therefore, in the Vitruvian column will be 1.11.76, which differs from that of the other by $\frac{66}{100}$ of an inch only.

## PLATE VIII.

Fig. 1. The volute at large described from the different centres.

The cathetus *a.b* recedes from the extreme point of the abacus one part of eighteen and a half, into which the whole extent is divided. The depth of the capital, including the volutes, is half the extent of the abacus: the volutes occupy eight parts of nine and a half, into which the depth is divided; three of these parts are below the abacus, and the remaining five equally divided between the cymatium and canal. According to this method of describing the volute, its width will be to its depth in the ratio of seven to eight: that is, the width will be $\overset{\prime}{1}.\overset{\prime\prime}{8}.79$, which differs from the width of the volute of the Ionian capital by rather more than half an inch. The spiral of this does not converge quite so suddenly as that of the volute in the plate before us.

Fig. 2. The eye of the volute enlarged to shew the centres.

The text of Vitruvius is so obscure as to the method of finding the centres, that there are various opinions upon the subject. The circle described within the square of the eye contains half the space of the eye itself, and therefore this diagram seems to illustrate the text; the words of which are, " dimidium oculi spatium minuatur——."

Fig. 3. Section of the capital made by a plane passing through the middle of the exterior face.

The projection of the cymatium, or ovolo, before the square of the abacus, is here made equal to the diameter of the eye, or $\overset{\prime\prime}{2}.97$ inches. This section also shews the depth of the canal *g*, which, according to Vitruvius, ought to be one twelfth of the depth of the volute, or $\overset{\prime\prime}{1}.98$.

Fig. 4. The flank of the Ionic capital shewing the pulvinar, or cushion; *h h* are the baltei, or bands; and *i i* the axes of the volutes.

Fig. 5. Section of the capital made by a plane passing through the middle of the flank.

In this section *h* is the balteus and *i* the axis. The limits of the baltei are within the arc described with the centre *k*, whose radius is equal to the distance of *k* from the furthest point of the cymatium.

## PLATE IX.

This plate exhibits parallel between the Ionic of Vitruvius, and the order of the columns of the Erectheum. The denticulus and coronae of the latter are similar to those of the portico of the Pandroseum attached to the same temple; and are here represented as bearing the same proportion to the epistylium.

The diameter of the shaft of the Vitruvian column is assumed 2̀.3̏.8, which is the diameter of the columns in the Athenian temple. The upper torus and trochilus are each 3̏.47. The whole extent of the plinth is made equal to one diameter and a half of the columns, or 3̀.5̏.7.

The whole height of the column, including the capital and base, is to be nine diameters and a half, the species of temple being the systle; this reduced to English feet would be 22̀.0̏.1. The height of the columns in the temple of

Erectheus is 21.7.5, being less than the proportionate height of the Vitruvian column by nearly a sixth part of the diameter. The columns being more than twenty feet in height, the upper diameter must be to the lower in the ratio of 6 to 7: hence the upper diameter will be 1.11.82, which differs but little from that of the Athenian column.

The extent of the abacus of Ionic columns whose height is less than 25 feet, ought to be equal to one diameter and an eighteenth part. In this instance, therefore, the extent would be 2.5.32: in the Athenian columns the extent is 2.5.4. The volutes of these latter are so very dissimilar to those of any of the columns found in Asia Minor, that we are not to be surprized if we find but little analogy between them and the volutes, as they are generally described by Vitruvius. Their projection however, before the line of the column, exceeds that of the others by 1.64 inches only; although their depth is greater by somewhat more than four inches.

From the state in which the Athenian temple remains, we are enabled to ascertain, with the greatest precision, the proportion which the epistylium, zophorus, and coronae severally bore to the height of the columns. The portico indeed has no member of the coronae corresponding to the denticulus of Vitruvius; but in that of Minerva Pandrosus, which is attached to the same temple, we find it introduced, and can readily ascertain the proportion it bore to the epistylium. In the entablature of the column which is here represented with the proportions of the Athenian, the denticulus is introduced, and its depth is made proportionate to the height of the epistylium.

It has been generally supposed that Vitruvius meant to include the cymatium in the height he assigns to the epistylium; but whenever he intends to include in one proportion the height of two members together, he expressly marks his intention. Thus speaking of the epistylium of Doric columns and the taenia, which is in the Doric order what the cymatium is in the Ionic, he says, " Epistylii altitudo unius moduli *cum* taenia et guttis;" and in Book iii. Chapter 3, " Corona *cum* suo cymatio quantum media fascia epistylii."

The height of the columns being more than twenty feet, it is to be divided into twelve parts and a half; one of these is given to the height of the epistylium; which therefore will be $\overset{\prime}{1}.\overset{\prime\prime}{9}.128$; this added to one seventh part of it gives $\overset{\prime}{2}.\overset{\prime\prime}{0}.146$, for the height of the epistylium and cymatium together. The corresponding height in the temple of Erectheus is $\overset{\prime}{2}.\overset{\prime\prime}{1}.05$. The zophorus of this temple having been ornamented with bronze sculpture, let us give to the zophorus of the Vitruvian entablature the proportion it requires when ornamented in a similar manner. In this case, the epistylium being $\overset{\prime}{1}.\overset{\prime\prime}{9}.128$, the zophorus will be $\overset{\prime}{2}.\overset{\prime\prime}{2}.41$, which added to one seventh part of it for the cymatium, gives $\overset{\prime}{2}.\overset{\prime\prime}{6}.18$ for the zophorus and cymatium together. The zophorus in the Erectheum is $\overset{\prime}{1}.\overset{\prime\prime}{11}.75$, which together with $\overset{\prime\prime}{5}.08$, the proportionate height of the cymatium below the denticulus, gives $\overset{\prime}{2}.\overset{\prime\prime}{4}.83$: thus those portions of the two entablatures, comprehended between the capital of the column and the denticulus, differ in height little more than $\frac{4}{10}$ths of an inch.

The denticulus is to be made equal to the middle fascia, or one third of the epistylium; its height, therefore, including the capital, which should be one seventh part added, will be $\overset{''}{8}.21$: the coronae, including the cymatium, should be equal to the denticulus without the capital, or $\overset{''}{7}.09$; and the sima an eighth part greater than the coronae, or $\overset{''}{7}.97$.

a....Plinth.
b....Lower torus.
c....Trochilus.
d....Upper torus.
e....Echinus.
f....Canal.
g....Abacus.
h....Epistylium.

i....Cymatium.
k....Zophorus.
l....Cymatium.
m....Denticulus.
n....Cymatium.
o....Coronae.
p....Cymatium.
q....Sima.

## PLATE X.

### ELEVATION OF AN HEXASTYLE PORTICO OF THE SYSTLE SPECIES ACCORDING TO THE PROPORTIONS OF VITRUVIUS.

In this portico the columns are made $\overset{'}{2}.\overset{''}{3}.8$ in diameter; in order to shew the analogy between it and the portico of the Erectheum at Athens, represented in plate XI. The intervals between the columns are made twice the diameter, or $\overset{'}{4}.\overset{''}{7}.6$; in the other portico the intervals are $\overset{'}{4}.\overset{''}{7}.4$. The whole extent of the front, comprehended between the outward faces of the columns at the angles, is, consequently, 37'.0".8. The corresponding extent in the Athenian portico is 36'.11".8, falling short of it one inch only.

If the columns be made nine diameters and a half in height, which is the proportion assigned by Vitruvius to columns of the systle species, they will exceed those of the Erectheum by 4".6 inches only.

## PLATE XI.

### ELEVATION OF A PORTICO HAVING THE SAME PROPORTION OF PARTS AS THAT OF THE TEMPLE OF NEPTUNE-ERECTHEUS.

It has been before observed that the entablature of the Erectheum had no member corresponding to the denticulus of Vitruvius. The proportion which the denticulus, introduced in this plate, bears to the epistylium, is similar to that which obtains in another portico connected with the same building.

## PLATE XII.

### FRONT OF A TEMPLE OF THE DIASTYLE SPECIES.

The limit of the intercolumniations in temples of the eustyle species, is two diameters of the columns and a quarter: whenever the interval exceeds this proportion, the species becomes the diastyle, in which the greatest allowed interval is three diameters. In the plate before us the interval is assumed between these limits, and, for the sake of a more simple fraction, is made two diameters and three quarters. The columns are here supposed to be 2.9.5 for the sake of exhibiting a parallel between this portico and that of the temple of Minerva-Polias at Athens: the columns of which are of the same dimensions, although the intervals are less, being only 7.5.5. Under these circumstances the whole extents of the porticoes would differ nearly eight inches.

The height of the columns of diastyle temples, according to Vitruvius, should only be eight times the diameter and a half: in this case therefore the height would be 23.8.75 being less than that of the columns in the portico of Minerva-Polias by nearly a fifth of the diameter. The columns being more than twenty feet high, the diminution of the shaft ought to be one seventh of the lower diameter, or 4.78 inches; the diminution in the shafts of the other columns is six inches. The height of the whole entablature of the first would be 6.7.54; and of the latter, provided the corona was embellished with a denticulus proportioned to the epistylium, 6.11.84.

## PLATE XIII.

A TETRASTYLE FRONT HAVING THE SAME PROPORTIONS AS THE PORTICO OF THE TEMPLE OF MINERVA-POLIAS AT ATHENS; WITH THE ADDITION OF THE DENTICULUS IN THE CORONAE.

According to Vitruvius the height of the fastigium of a front of the same extent should be $\dot{4}.\ddot{0}.5$. In the portico of the temple of Minerva-Polias the height is only $\dot{3}.\ddot{4}.5$.

## PLATE XIV.

### FLANK OF A PSEUDODIPTERAL TEMPLE HAVING A PODIUM ON THREE SIDES.

Having shewn the fronts of various temples, it is necessary to give an idea of the appearance of the flanks. The flank of the temple represented in this plate is, in many respects, similar to that of the temple of Fortuna-Virilis at Rome. In some few instances, we find temples receiving their light from windows; those which are here introduced are taken from the west front of the Erectheum. Lions heads are represented in the sima in the manner described by Vitruvius; and the roof supposed to be covered with tiles, or stone sculptured in the form of tiles.

Fig. 2.


Fig. 1.

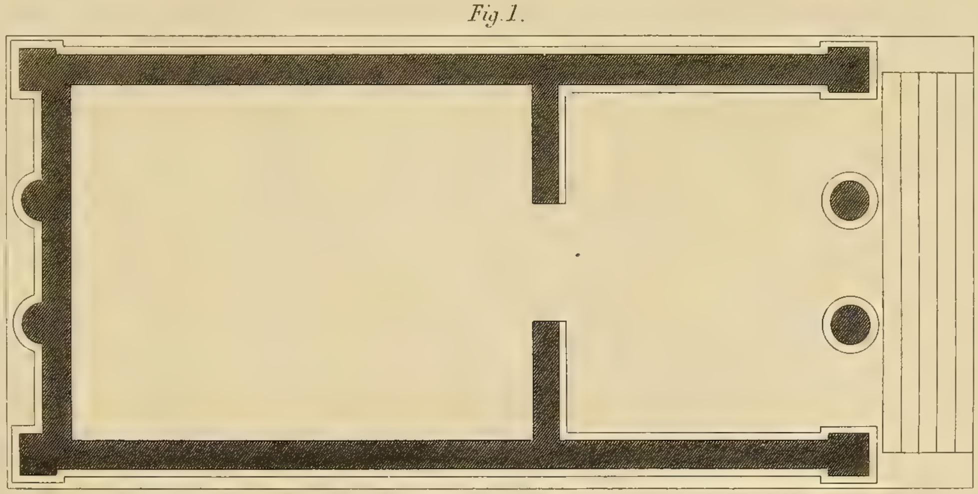

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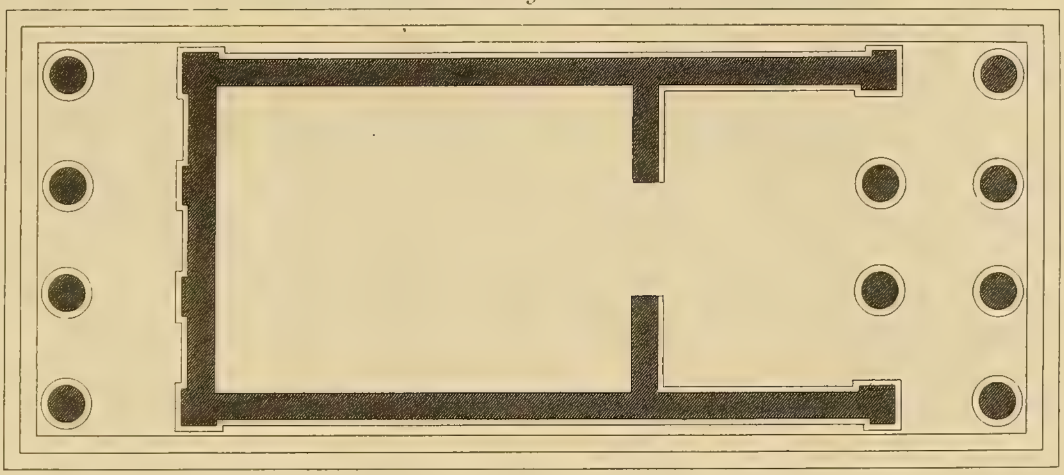
Fig. 1.



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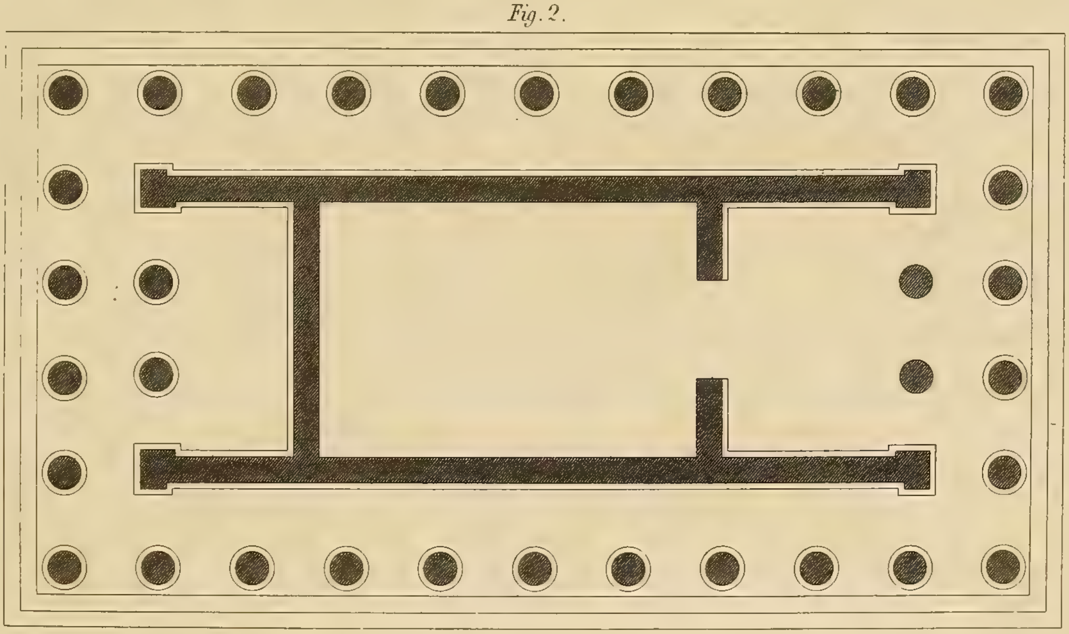

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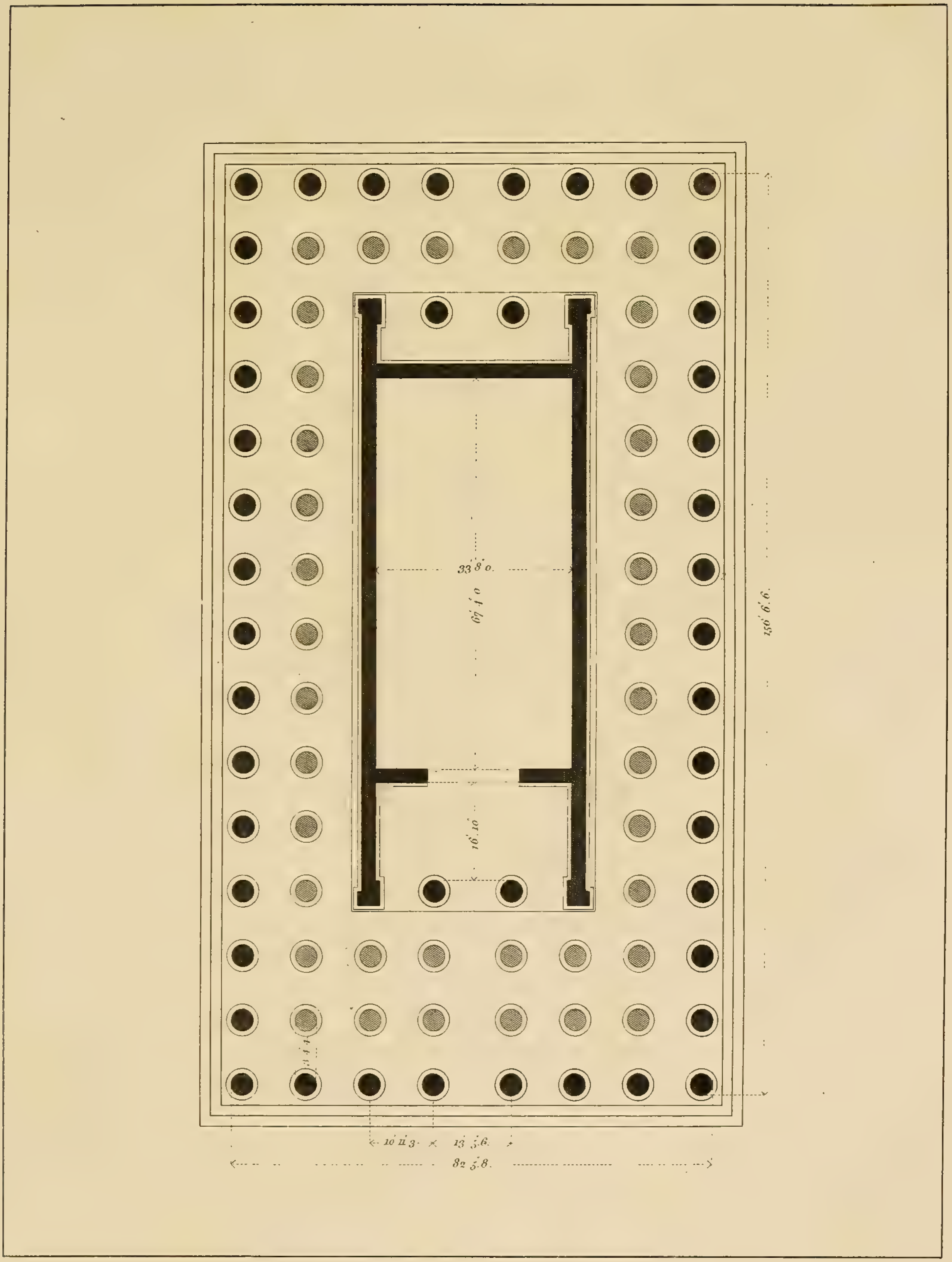


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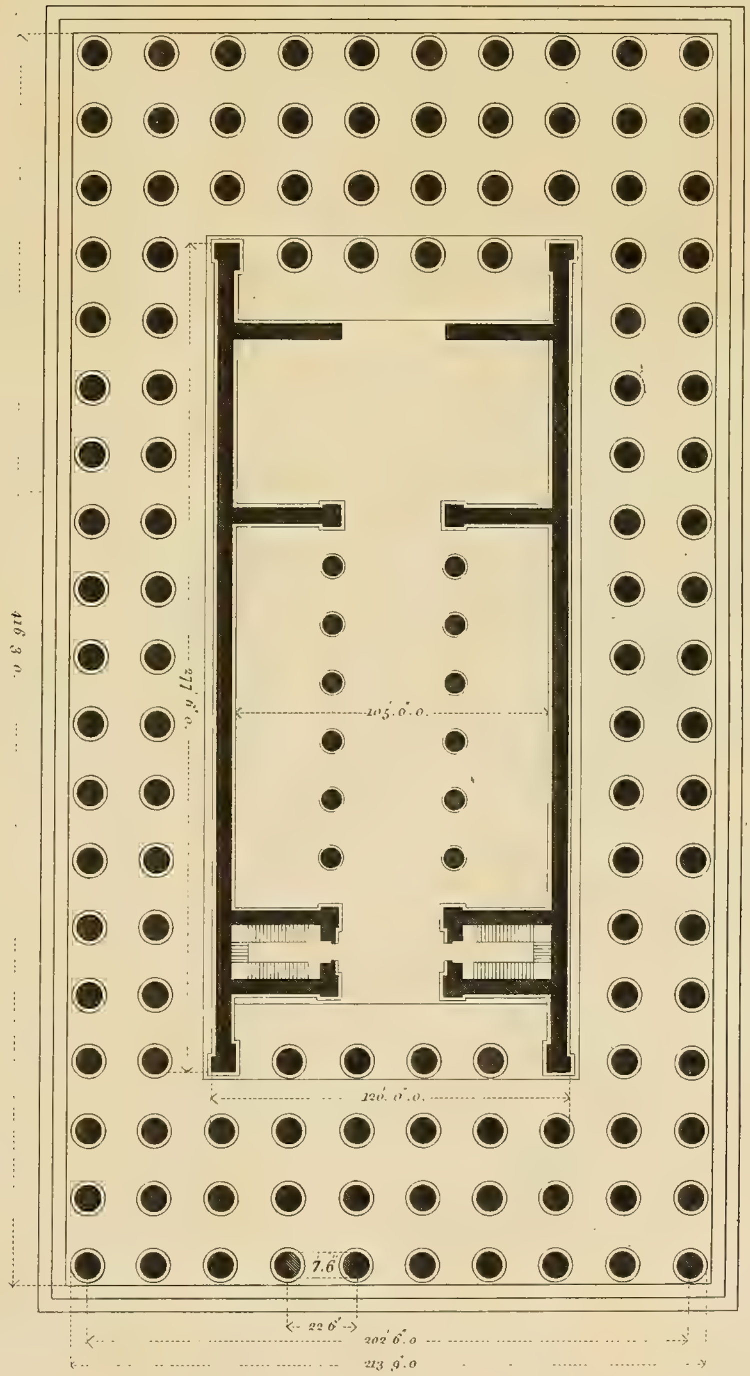


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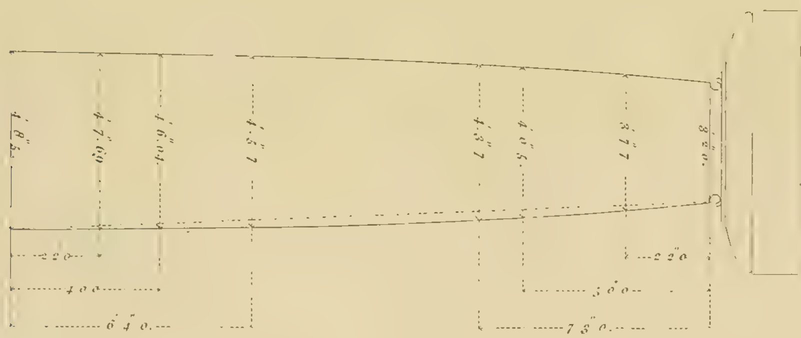

Fig. 1.

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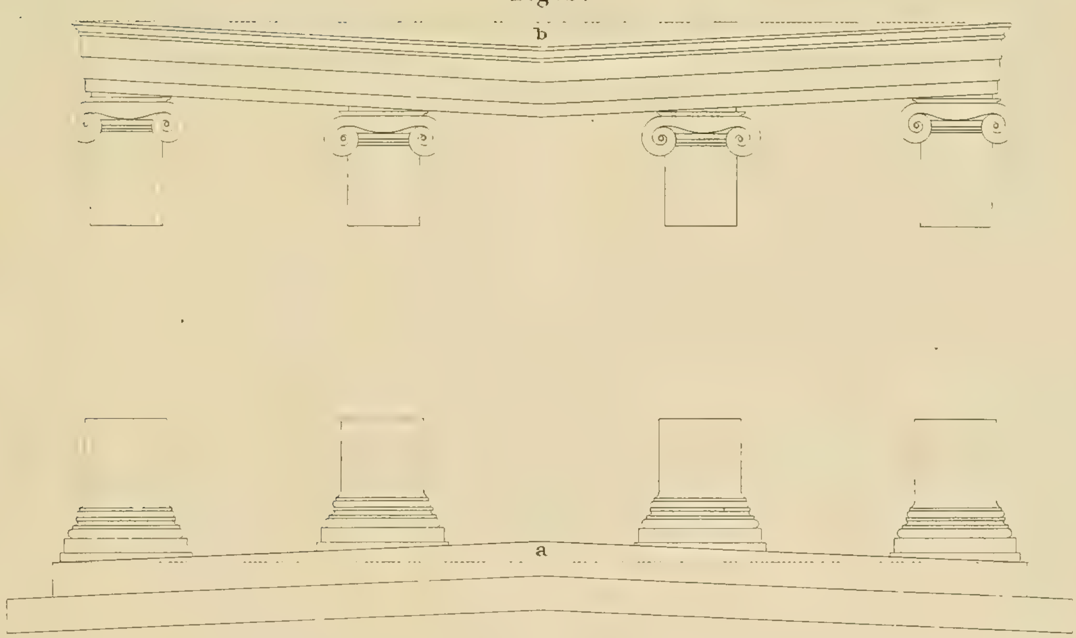


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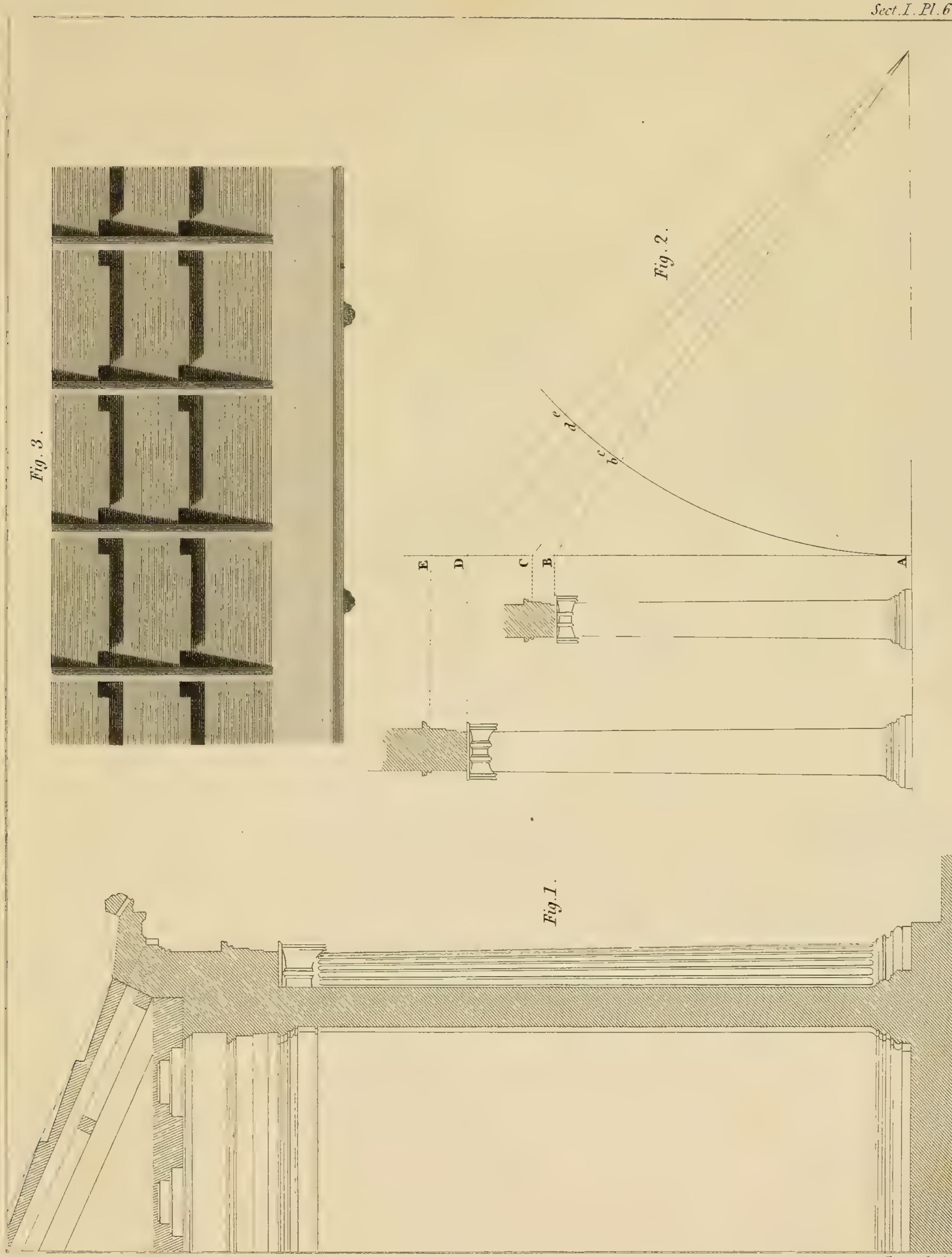


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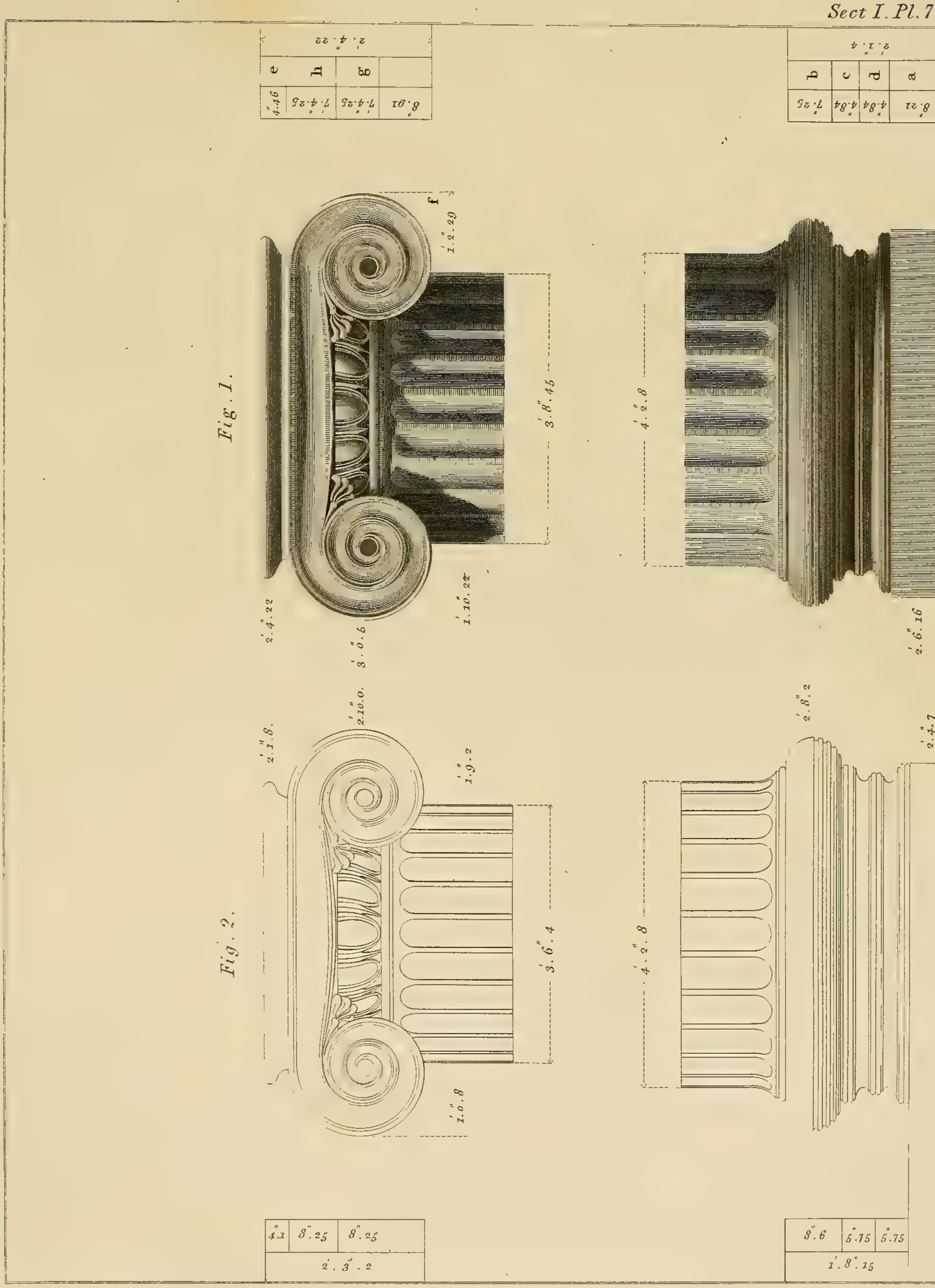


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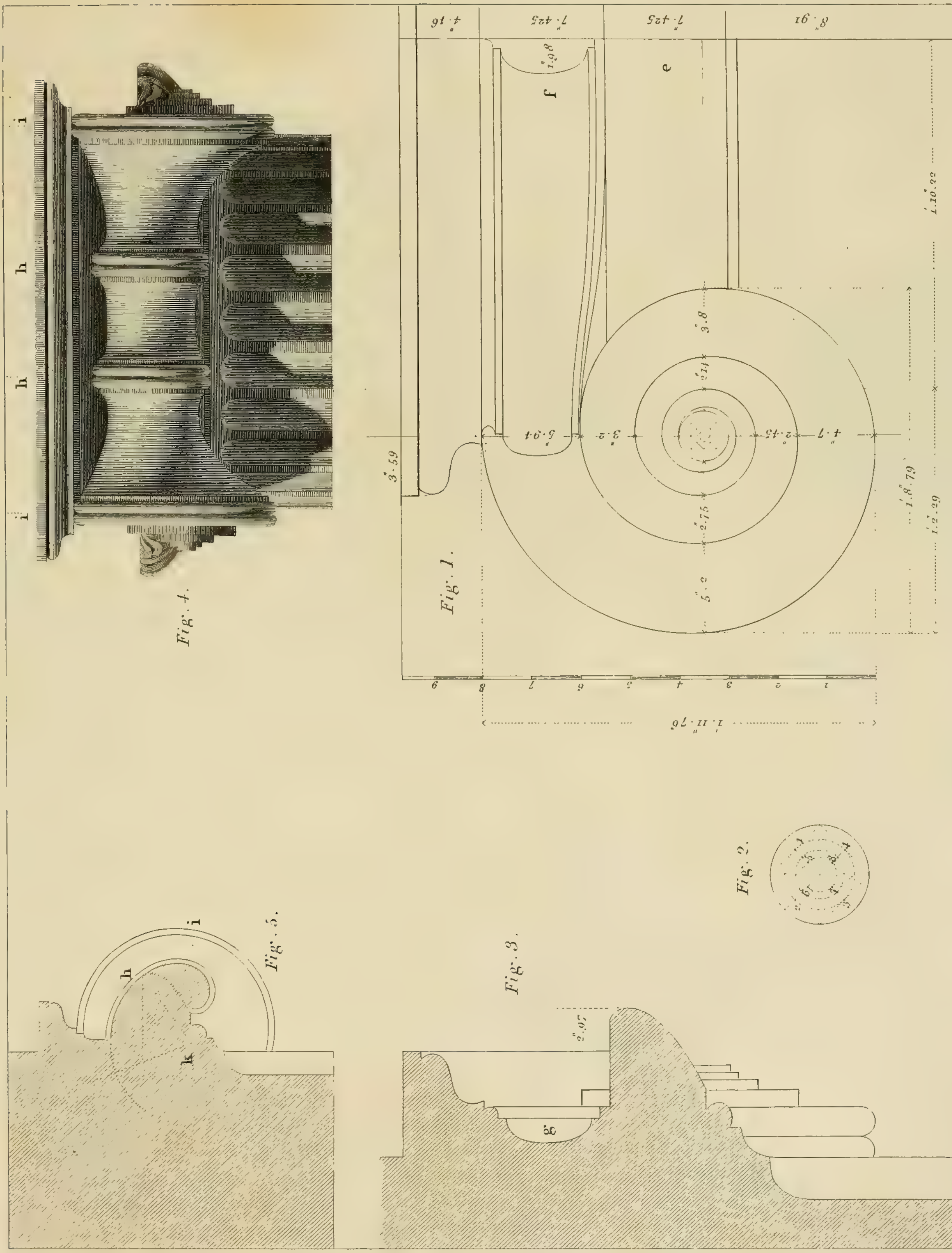


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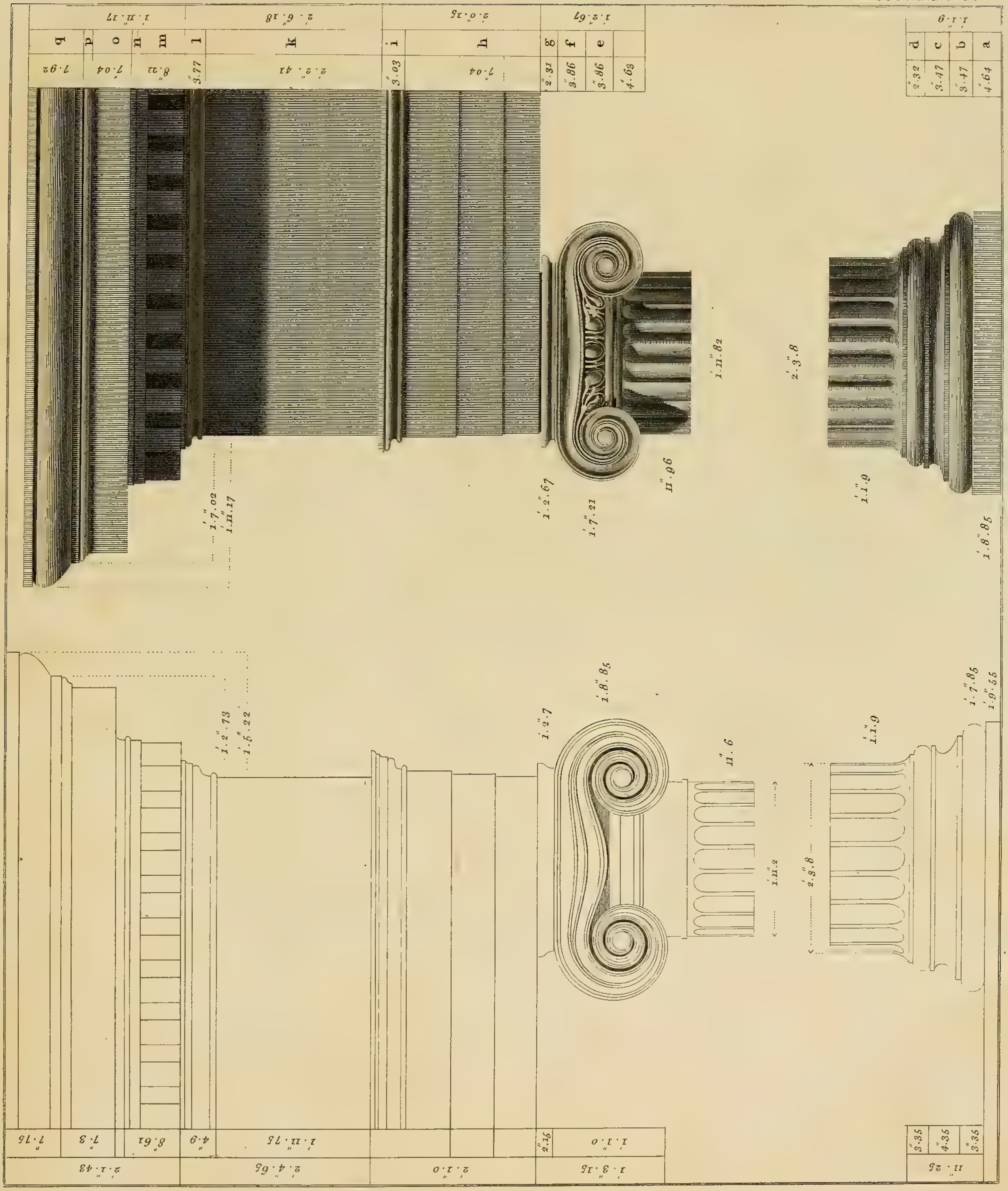

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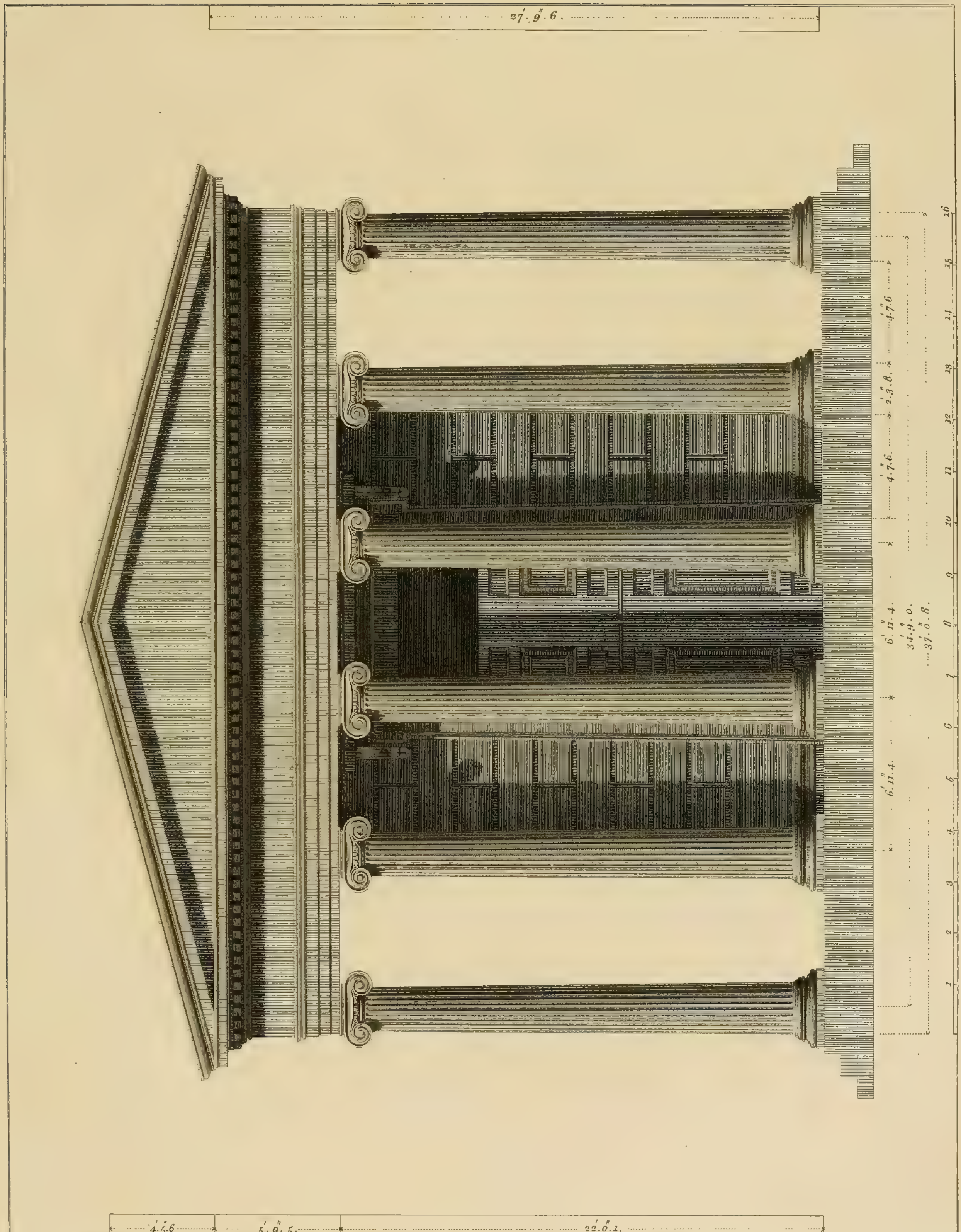


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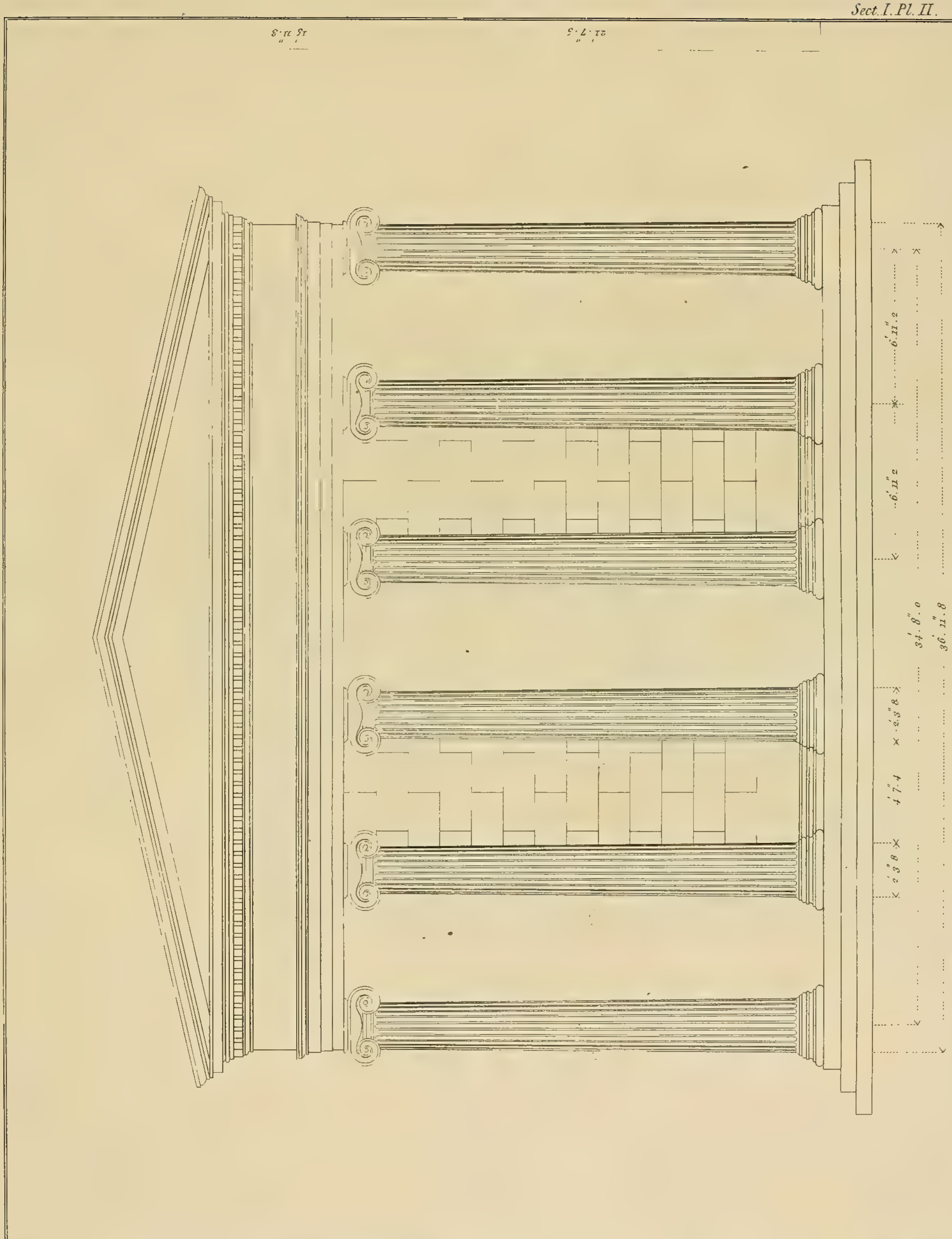


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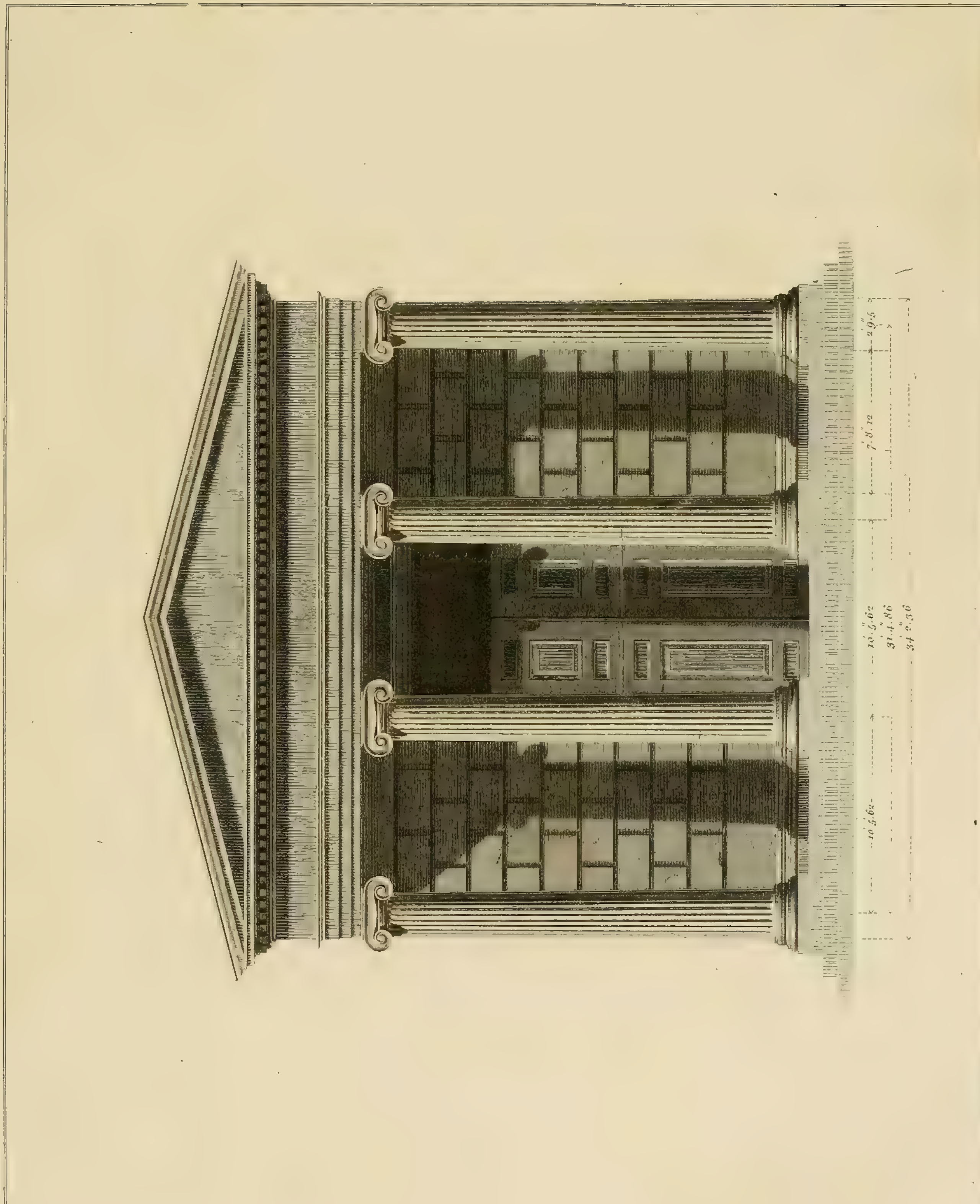

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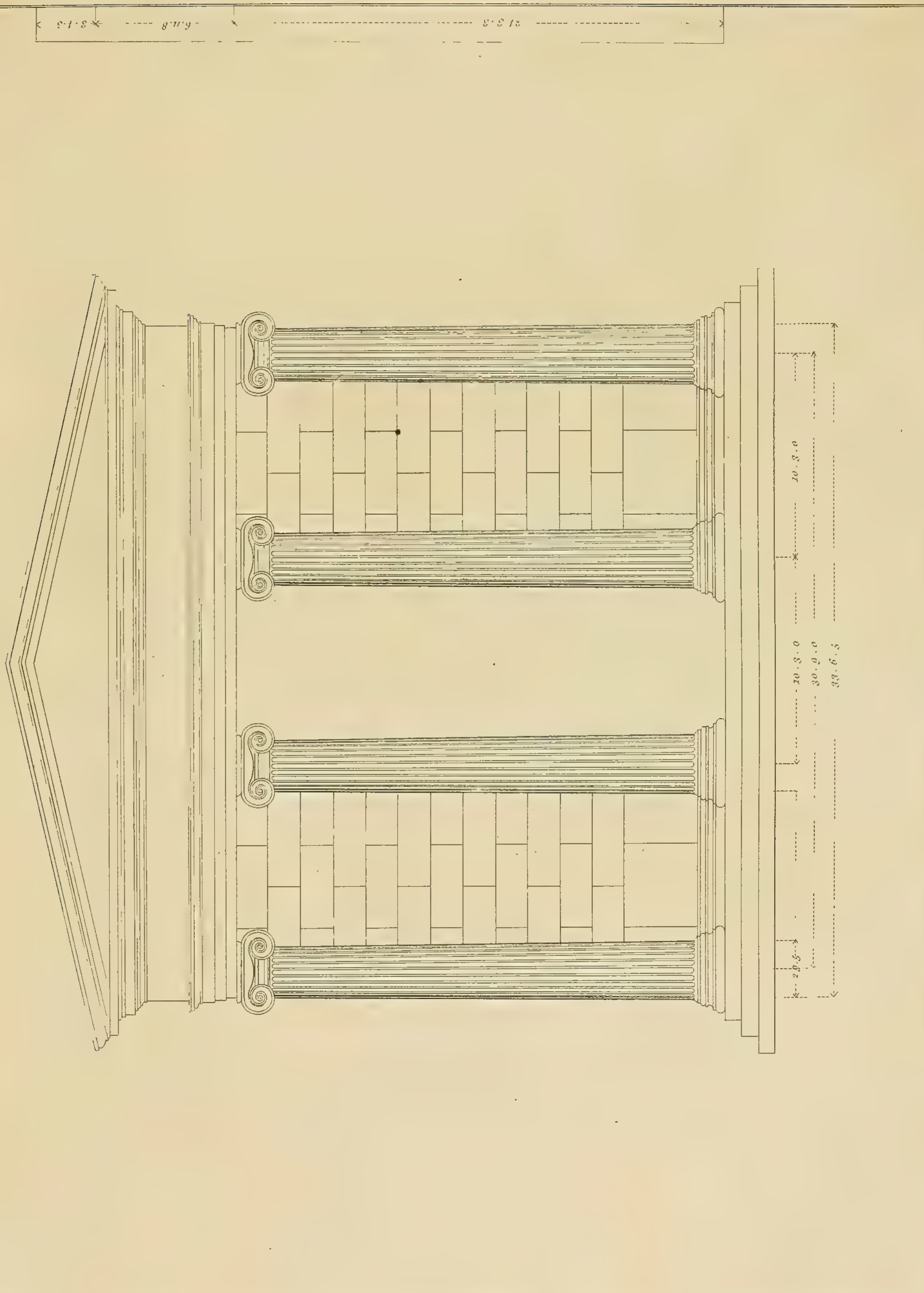


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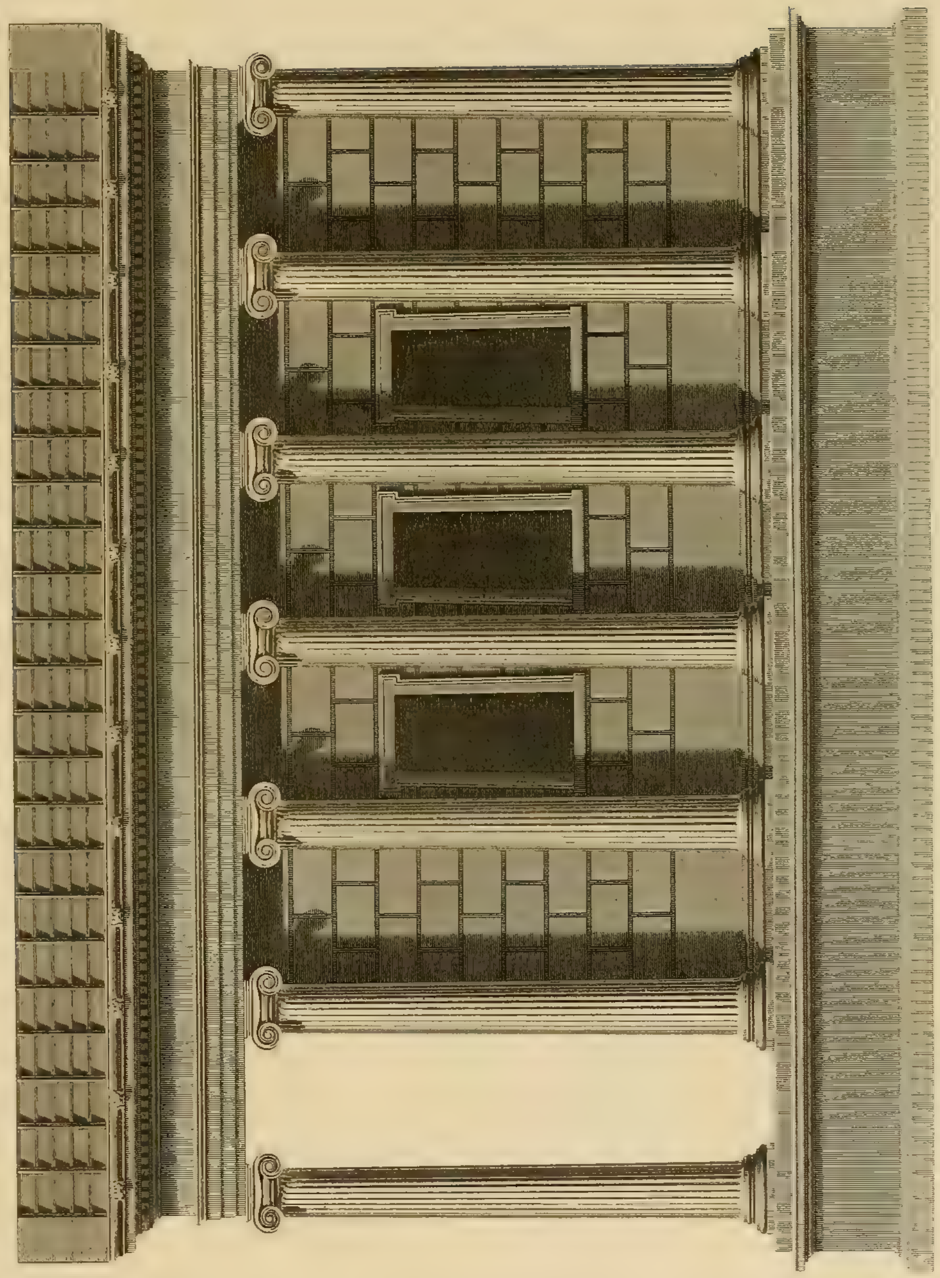

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THE

# CIVIL ARCHITECTURE

OF

# VITRUVIUS.

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## SECTION II.

THE

# CIVIL ARCHITECTURE

OF

# VITRUVIUS.

## SECTION II.

### CHAP. I.

#### OF THE THREE ORDERS OF COLUMNS, THEIR ORIGIN, AND THE PROPORTIONS OF THE CORINTHIAN CAPITAL.

The proportions of Corinthian columns are in every respect, excepting their capitals, similar to those of Ionic; although their form is more graceful and proportionably more delicate by reason of the greater height of the capitals: for Ionic capitals are a third part only of the lower diameter of the columns, whereas the Corinthian capital is equal in height to an entire diameter. The peculiar character of the capitals, which admits of their being higher than those of Ionic columns by two thirds of a diameter, gives beauty to the columns by permitting an increase of the height without violating the laws of symmetry.

The members constituting the entablature of this order, observe the proportions which obtain either in the Doric or Ionic: for the Corinthian has no proportions, for the coronae and other concomitant ornaments, peculiar to itself; but mutules are placed in the coronae, according to the manner in which triglyphs are disposed in the Doric zophorus, and the epistylia are ornamented with guttae[1]; or the zophorus is enriched with sculpture and surmounted with the denticulus and coronae, after the Ionic manner. Thus by uniting with the characteristics of the other orders a capital whose form varies from both, a new order arises.

From the circumstances attending the origin of the three orders arose their several denominations of Doric, Ionic, and Corinthian; of these several varieties the first mentioned claims the priority of invention. Dorus, the son of Hellen and the nymph Opticus, who governed Achaia and the whole of the Peloponnesus, in some period of his reign, dedicated a temple to Juno in the ancient city of Argos. The order of architecture employed in the construction of this sacred edifice, which, from its founder, was termed Doric, was afterwards adopted by the cities of Achaia; although no certain principles had been yet established by which its proportions might be regulated.

[1] The only instance of the guttae forming an uninterrupted ornament of the epistylium of a building, detached from the taenia, is in the Choragic monument of Thrasyllus, built in the side of the Acropolis at Athens. We cannot however insist that this building is of the Corinthian order; because antae are used instead of columns; and from the antae alone we cannot always decide the order of the building. We know that antae, similar to those of the Choragic monument, were sometimes introduced with Corinthian columns; as in the porticoes of the tower of the winds. For the same reason there is no authority for ranking this amongst edifices of the Doric order; especially in the absence of triglyphs in the zophorus. There is a circumstance which inclines us to believe that it might with greater propriety be classed with Corinthian buildings; which is, that other monuments erected in commemoration of Choragic victories, such as that of Lysicrates and the columns on the rock of the Acropolis, are of that particular order.

In a subsequent aera the Athenians, in conformity with the response of the Delphic oracle, by the general consent of the states of Greece, sent thirteen colonies into Asia, each conducted by an experienced leader; and invested Ion, son of Xuthus and Creusa, whom Apollo by his priestess acknowledged as his offspring, with the supreme command. He led them into Asia, and possessed himself of the territories of the Carians, in which he founded the cities of Ephesus, Miletus and Myus; the latter of which being destroyed by an inundation, its rites and privileges were transferred by the Ionians to the Milesians; likewise Priene, Samos, Teos, Colophon, Chios, Erythrae, Phocaea, Clazomenae, Lebedus, and Melite. The last was destroyed in the war which was undertaken by the general concurrence of the other cities to punish the arrogance of its inhabitants; and in its place Smyrna was afterwards admitted amongst the confederated states, through the mediation of Attalus and Arsinoe.

After the expulsion of the Carians and the Leleges, the new acquisition was called Ionia, from the name of the chief of the colonists; and temples were erected to the deities of the Grecian mythology, the order of architecture of which was similar to that observed in the sacred buildings of Achaia; and called the Doric, from having originated in the Dorian cities. The temple of Apollo Panionius was the first they constructed in this manner. Desirous of adorning this temple with columns, but unpractised in the rules of proportion, they were led to consider the proportions of the human frame; expecting principles to result from them by the adoption of which the great objects of strength and beauty would be obtained. Finding that the foot was a sixth part of the height of the whole stature, they instituted the same proportions in their columns, whose height, including the capital, they made equal to six times the diameter of the shaft at the base. Thus the Doric column, formed according to the proportions of the human figure, and emblematical of manly strength and beauty, was first introduced in the temples of Ionia. In later times however, when it was in contemplation to consecrate a temple to Diana, they sought to introduce a new order of columns by giving to them the proportions of the female form; and that they might be emblematical of feminine delicacy, the height of the columns was made eight times the lower diameter. Bases were also given to them in imitation of sandals, and volutes were sculptured in the capitals in allusion to the ringlets which fell down on either side the face. The cymatia and encarpi[1]

[1] The commentators are at a loss to imagine what is meant by the encarpi. The Greek word *encarpos* signifies abounding in fruit; hence Philander supposes, that the term was applied to the sculptured garlands, composed of fruits and flowers, which, in some examples of the Ionic order, are observed to be suspended from the eyes of the volutes. The instances, however, in which these occur are of modern date, and no antique Ionic capitals afford authority for the introduction of such an ornament; which it is probable might be first suggested by the garlands or festoons occasionally suspended during festivals. It is moreover difficult to trace any resemblance between garlands of this kind and the hair as it was then worn. It is not unlikely that the encarpi were the plaited bands which we find sculptured in the capitals of the columns of the Ionic temples upon the Athenian Acropolis. The hair of the Caryatides, supporting a portico attached to the same temples, is represented as braided and carried round the head.

Pollux mentions the pericarpia amongst the ornaments of women: they appear to have been bracelets and wrist-bands. The Greek word *carpos* signifies the wrist. Poll. lib. v. 16.

in front were intended to resemble the hair as it was then worn, and the shaft was channelled in such a manner as to bear some resemblance to the folds of the matronly garment.

Thus the invention of two different orders arose; one exhibiting the boldness and simplicity of the masculine figure; and the other the more finished form of a woman, attired and richly decorated. Latter ages however, advancing in refinement and judgment, sought to give greater beauties to both by making the Doric column seven times its diameter at the base of the shaft; and the Ionic nine times[1] its lower diameter. The order whose use was adopted first by the Ionian colonies, was called the Ionic.

The third order, which is termed Corinthian, derives its symmetry from an intention to make the form of the column accord with the more delicate proportions of the maiden figure: for at that early period of life the limbs are less robust, and the figure admits of a greater display of ornament. The invention of the capital is said to owe its origin to the following circumstance. A virgin of Corinth, just as she had attained to a marriageable state, was attacked by a disorder whose effects proved fatal. After her interment the vases, the objects of her admiration when alive, were collected by her nurse and deposited in a basket, which she placed upon the grave, after covering it with a tile to protect it from the weather. The

[1] The manuscript copies read nine; in order, therefore, to obviate the antilogy, which the adoption of this reading would cause in this and the passage in the second chapter of the first section, relating to the height of eustyle columns, as it stands in the printed copies, the editors have here substituted " octo semis," for " novem."

basket was accidentally placed over the roots of an acanthus. The natural growth of the plant being impeded by the pressure upon it, the middle leaf and the cauliculi appeared in the spring around the bottom of the basket. The cauliculi, attaching themselves to the external surface, grew upwards, until their progress was arrested by the angles of the tile projecting over the basket; which caused them to incline forward and assume a spiral form. At this stage of its growth Callimachus, who, from his great genius and talent for sculpture, was called Catatechnos by the Athenians, chancing to pass by the spot, observed the basket and the beauty of the young foliage around it: pleased with its fanciful and novel appearance, he adopted it in the columns which he afterwards employed in the edifices of Corinth: having first instituted laws for the proportions of the order; which was thence termed Corinthian.

The proportions of the capitals are these. The height, including the abacus, is equal to the lower diameter of the columns; and the diagonal line drawn from the opposite angles of the abacus is twice the height of the capital. All the fronts of the abacus are of an equal extent; and are made concave, the central point in each front receding a ninth part of the extent comprehended between the angles. The diameter of the capital at its base is the same as that of the columns below the astragal and apothesis. The depth of the abacus is a seventh part of the whole height of the capital: the remaining part is equally divided into three parts, one of which is occupied by the lower leaf; the second is given to the middle leaf; and an equal space remains for the cauliculi, whence those leaves shoot which projecting forwards appear to support the volutes[1]. The volutes spring from the leaves of the cauliculi and extend to the angles of the abacus: the lesser helices are carved in the middle of the capital below the flowers in the abacus[2]. These flowers occur in every front of the abacus, and are made as large as the height of it will admit.

Such are the proportions of the Corinthian capital. It is however a practice with some to place various capitals upon columns of this kind, to which they give a diversity of appellations. They have no laws of proportion peculiar to them; yet the columns cannot be said to be of a new order, for their characters, although disguised, may be traced either to the Corinthian, Ionic or Doric, whose symmetries are still preserved, although attempted to be concealed by the introduction of novel and capricious ornament.

[1] The printed copies read " uti abacum excipiant:" but the MSS. omit the word *abacum*. The accusative case to the verb is probably *volutas* in the next line; which may have been altered to volutae.

[2] The text of the printed editions is altered from, " minoresque helices intra suum medium qui sunt in abaco floribus subjecti scalpantur;" to, " minoresque helices qui intra medium frontium abaci sunt subjecti scalpantur."

# CHAP. II.

## OF THE ENTABLATURES OF COLUMNS.

After having expatiated on the different orders of columns, the people amongst whom they arose, and what led to their several inventions, it becomes expedient to treat of their entablatures; to give some account of their origin, and what first suggested their introduction in buildings.

In all edifices the superstructures are formed by timbers which have different designations: and as they vary in name, so also are the purposes to which they are applied equally distinct. The trabes are placed longitudinally over the columns and antae; and the tigna and axes support the frame work of the roof. If the span of the roof be great, transtra and capreoli will be found necessary; but if otherwise, a columen[1] alone will suffice, with canterii projecting to the eaves of the roof. Templa are layed upon the canterii, and asseres upon them, below the tiles, projecting beyond the surface of the walls. Thus every piece has a situation correspondent to the purpose to which it is intended it should be applied.

In imitation of these early inventions and of works executed in timber, the antients, in constructing their

[1] In the printed editions there is an interpolation of a whole passage between the words, "majora spatia sunt," and "transtra;" for which there is no authority in the manuscripts whatever.

edifices of stone or marble, adopted the forms which were there observed to exist. It was a general practice amongst the artificers of former times to lay beams transversely upon the walls, of such a length that their ends projected before the exterior faces of the walls; the intervals between them were then closed, and the whole surmounted with coronae and fastigia of pleasing forms, executed in wood. The projecting parts were afterwards cut away so that the ends of the beams and the walls were in the same plane; but the sections presenting a rude appearance, tablets, formed like the triglyphs of more modern buildings, and covered with blue wax, were affixed to them[1], by which expedient the ends, which before offended the eye, now produced a pleasing effect. Thus the antient disposition of the beams supporting the roof is the original to which we may attribute the introduction of triglyphs into Doric buildings. In works of a subsequent age canterii were added, projecting before the triglyphs in a perpendicular direction to them: the direction of the ends which projected was made inclining; and as the disposition of the tigna before gave rise to the use of triglyphs, the projecting canterii now suggested the introduction of mutules below the coronae. Wherever we find mutules adopted in buildings of stone or marble, we may observe that

[1] The projecting ends of the beams being cut away close to the face of the wall, when these tablets were affixed to them they must have had a projection before the plane of the trabes, which were immediately over the columns and antae, and answered to the epistylia of subsequent buildings. In the generality of Grecian temples the faces of the tablets, or triglyphs, are in the plane of the epistylium: some instances however of the contrary occur; as in the portico of Philip in the island of Delos; and in the gate of the Agora at Athens.

the plane of their under surfaces is inclined, which indicates an intention of imitating the appearance of canterii projecting before the building in order to form the eaves.

The most rational way of accounting for the introduction of triglyphs and mutules in the buildings of the Dorian cities, is by supposing it to have resulted from imitations of these early inventions. For we cannot admit, as some have erroneously insisted, that the triglyphs in more modern buildings are representations of windows in edifices of an earlier date; because they are introduced at the angles, immediately over the tetrants of the columns; in which places it is not possible that windows could ever have been left: for if these spaces remained open for the admission of light, all connection at the angles of such buildings would have been destroyed. If we allow that openings formerly were left where triglyphs are now placed, we must also grant that the denticuli of Ionic buildings were formerly apertures through which light was admitted; because the intervals between the triglyphs and denticuli were indiscriminately termed metopae; for the word *ope* amongst the Greeks signifies the bed upon which both the tigna and asseres rest; and what with us are termed cava, or columbaria, by them are called metopae, because they are the intervals between two opae.

The same kind of reasoning which serves to explain the origin of triglyphs and mutules in the Doric order, will assist us in tracing the prototype of denticuli in the Ionic entablature; for as the mutules are typical representations of canterii, so in like manner the denticuli are in imitation of the projecting ends of the asseres. Hence it is that in Grecian buildings denticuli are never placed below mutules, because the asseres could never have been below the canterii: nor can that building be constructed upon just principles where we find those objects represented below the canterii and templa which ought, consistently with propriety, to have had their station above them. For a similar reason the Greeks never introduced mutules or denticuli in the fastigium, but simply coronae; because neither canterii nor asseres have their ends towards the fronts; neither can they have any projection beyond the tympanum, for their direction is from the upper part of the roof towards the eaves. What therefore could not in reality exist they considered improper to be represented in sculpture. In the most perfect of their productions they suffered nothing to enter but what was consistent with propriety, and deduced from the just ordinance of nature; approving only of what could be supported by arguments founded upon the basis of truth and reason. The symmetries and proportions which they have left behind them for the various orders of architecture were deduced from such unerring principles. We have already explained the proportions which obtain in the Corinthian and Ionic orders; it remains that we should now describe, as concisely as the subject will permit, those which are peculiar to the Doric order.

# CHAP. III.

## OF THE DORIC ORDER.

Some individuals, amongst the number of antient architects, have contended that the Doric order ought not to be adopted in sacred edifices; because its peculiar characters, if strictly observed in the construction of temples, would be inconvenient, and at variance with the purport of the building. Tarchesius and Pitheus were amongst the number; and it is thought that Hermogenes was of the same opinion; because, having prepared a great quantity of marble with the intention of erecting a temple to Bacchus of the Doric order, he altered his design, and with the same materials built an Ionic temple. Not indeed that the order is considered as inelegant or deficient in majesty; but the manner of placing the columns is thought to be inconvenient, inasmuch as it renders the just distribution of the triglyphs and the lacunaria difficult. For in general the triglyphs are placed immediately over the axes of the columns, and the width of the metopae is made equal to their height; but the triglyphs over the columns at the angles of the buildings are placed at the extremities of the zophorus, and not over the axes of the columns; whence it happens that the metopae next these triglyphs cannot be perfect squares, but their width must exceed their height by a space equal to half the width of a triglyph. When therefore the metopae are made equal, it becomes necessary to contract the width of the intercolumniations at the angles by a space equal to this excess. Whether the metopae be enlarged or the intervals contracted inconvenience arises; and hence it was that the antients avoided the use of the Doric order in sacred edifices.

It is, nevertheless, our intention to describe the proportions of the Doric order as we have received them from our predecessors; in order that those who are desirous of being made acquainted with them may find them explained, and be enabled to introduce them, divested of their defects, in the construction of sacred edifices.

That part of the extent of a Doric tetrastyle front which is occupied by the columns should be divided into twenty-eight parts: or if the front be hexastyle, the number of parts into which this extent ought to be divided is forty two[1].

[1] The printed copies vary in their statement of the number of parts into which we are directed to divide the fronts of hexastyle and tetrastyle temples of the Doric order. The Amsterdam edition reads XXVIII, and XLIV: which reading is also adopted by the Berlin editor. Philander alters the reading to XXVII, and XLII. The five MSS. copies which I have consulted invariably make the number of divisions of the tetrastyle front XXVIII. The number for the hexastyle front is altogether omitted in three, but the two remaining state it to be XXXII. All of them agreeing in the number of divisions for the tetrastyle front, we can have no hesitation in supposing that to be the number intended by Vitruvius. On proceeding to enquire if the number XXXII, for the divisions of hexastyle front, be commensurate with the number for the tetrastyle, we find that that is far from being the case: for in order to be commensurate with that number, the divisions of the hexastyle ought to be XLIII and six tenths. To reconcile this with the number of divisions stated in the MSS. and at the same time to observe the least possible variation in the mode of writing the digits, we must suppose that originally the number was written XXXXII; and altered in the subsequent transcripts to XXXII.

One of these divisions is made the modulus, which the Greeks call *embates*, according to which the proportions of the entire edifice are determined.

The diameter of the columns is made equal to twice the modulus, and their height, including the capital, is seven times the diameter. The height of the capital is one modulus; and its greatest width is twice its height and a sixth part. The height is divided into three equal parts, the upper of which is given to the plinth, including the cymatium; the second to the echinus with its annulets; and the third to the hypotrachelium. The contraction of the shaft is similar to that of Ionic columns, which has already been explained.

The height of the epistylium, with the taenia and guttae, is one modulus: the taenia itself is a seventh part of the height. The guttae extend the width of the triglyphs below the taenia; their height, including the regula, is a sixth part of the modulus. The width of the epistylium is equal to the diameter of the shaft at the hypotrachelium.

Upon the epistylium are placed the triglyphs and their metopae: the height of the triglyphs is a modulus and an half, and their width in front two thirds of their height. The triglyphs at the angles, as well as those which are intermediate, are placed immediately over the axes of the columns. Between the triglyphs so arranged two others are disposed, over every intercolumniation excepting that in the centre; which, in both pronaos and posticus, is made sufficiently wide to admit of three; in order that the access may be commodious to those who come to their devotions in the temple. The width of the triglyphs is divided into six parts, of which two and an half are set off on each side of the line in the centre of the triglyphs; the regula, or femur, which the Greeks call *meros*, equal in width to one of the parts, is first left in the centre of the triglyph; then on each side channels are formed as if hollowed with the vertex of a square: next these are two femora, similar to that in the middle of a triglyph, leaving half a channel at either extremity.

The metopae between the triglyphs are left equal in width to their height, excepting at the angles of the zophorus where spaces are left equal in width to half a triglyph only[1]. Thus the inequalities which must necessarily occur in the lacunaria when the angular intervals are contracted; or in the metopae, when triglyphs are placed at the angles, will be avoided. The capital is a sixth part of the modulus.

Upon the capitals of the triglyphs the coronae is placed, projecting half a modulus and a sixth part; having a Doric cymatium below and another above: its height, including

[1] The space left at the angles is not accurately equal to the width of a semitriglyph; being as much less as the projection of triglyphs before the face of the metopae. In the description of the monotriglyph species, the space left between the angles of the zophorus and the triglyphs is properly said to be less than half the width of a triglyph. In Grecian temples it may be observed, that if we continue the lines passing through the axes of the columns at the angles, they will coincide with the interior lines of the triglyphs: hence at the first view it might appear that if the triglyphs were removed, so as to bring the centre point in this line, a space would be left at the angles equal to half the width of a triglyph: but upon removing the triglyphs we expose the plane of the metopae in the flanks, which recedes from that of the triglyphs.

the two cymatia, is made half the modulus. In those parts of the under surface of the coronae immediately over every triglyph and the centre of each metopa, channels are cut, which leave six guttae in length and three in depth. The spaces which are left between every two adjoining clusters of guttae, by the excess of the width of the metopae above that of the triglyphs, are either left plain or hollowed into channels[1]. In the projecting angle of the coronae a small hollow is sculptured, which is called scotia. All the remaining parts, such as the fastigium, its coronae and simae, observe the same laws of proportion as have already been laid down for the Ionic order.

The foregoing proportions are to be adopted only in temples of the diastyle species. When the species of the temple is pycnostyle[2], and one triglyph only is introduced over the intervals between the columns, the front, if it be tetrastyle, should be divided into eighteen parts: if the front is to consist of six columns, it should be divided into twenty-eight parts[3]. In either case one of these parts is assumed for the

[1] The printed editions read, " fulmina scalpatur:" but the MSS. read either *fluvia*, or *flumina*. The meaning of Vitruvius is that the regula, or band over the guttae, is either continued without interruption, or is broken by being cut away between the clusters of guttae.

[2] See the explanation of plate III. at the end of this book.

The number of these divisions is differently stated by the editors of Vitruvius. The Amsterdam and Berlin editions make the numbers XXIII, and XXXV. Philander makes them XIX.S. and XXIX.S. On examining the manuscripts in the Harleian collection, I find that only one out of five, makes the number of divisions for the tetrastyle monotriglyph front XXIII; the remaining four agree in stating it to be XVIII. The number of divisions for the hexastyle front is stated in two of them to be XXVIII; and in three others XXIX. The authority for the latter is therefore greater than for the number twenty-eight: but twenty-eight divisions for modulus, according to which, as in the diastyle species, the proportions of the entire edifice are determined. Upon the several blocks, which extend from centre to centre of two adjoining columns and form the epistylium, two triglyphs and two metopae are placed, leaving at the angles a space somewhat less than the width of half a triglyph. The centre interval is enlarged so as to receive three metopae and three triglyphs; in order that the approach to the temple may be rendered commodious, and the view of the statues uninterrupted. Upon the capitals of the triglyphs the coronae is fixed; having, as in the preceding instance, a Doric cymatium below and another above it: the height, including the cymatia, is half a modulus. The disposition of the drops, which follow from cutting the channels, and every thing remaining to complete the front, should observe the same laws of proportion which obtain in temples of the diastyle species.

The columns should have twenty flutings; these are sometimes left with a plane surface, in which case the plan of the columns is a polygon with twenty angles: but when they are to be channelled a square must be formed, one of whose sides is the width of each of the flutings. From the centre of the square an arc, whose radius is equal to half the diagonal, is described, which is terminated by the two angles of the square: the area included between the side of the square and the arc is the quantity taken from the shaft in the formation of every fluting. This method of fluting is peculiar to the

the hexastyle front are more nearly commensurate with eighteen for the tetrastyle, the authenticity of which seems established by a great majority, and may on that account be preferred when sanctioned by the reading of two amongst five.

Doric order. The entasis of the shafts of Doric columns is similar to that already described for columns of the Ionic order.

Having now explained whatever relates to the external decoration of temples of the three several orders, the proportions for the cella and pronaos become the next consideration.

## CHAP. IV.

### OF THE PROPORTIONS OF THE PRONAOS AND THE INTERIOR OF THE CELLA.

The width of the temple is usually made equal to half the length: the cella, including the wall in which the door-ways are made, should be a fourth part longer than its width. The remaining three parts are given to the pronaos, and comprise in their extent the antae terminating the walls. The width of the antae ought to be equal to the diameter of the columns. If the width of the temple be more than twenty feet, two columns are placed between the antae, and thus separate the pronaos from the pteroma. The three intervals between the columns and antae should be closed with plutei[1] of marble or wood work, and door-ways left in them to give access to the pronaos.

If the width be more than forty feet, columns should be placed inwardly opposite to those between the antae; of a corresponding height, but their diameters less in the following

[1] The word pluteus has different significations. In this passage, it means the walls between the columns, like what is observed in the flanks of the temple of Fortuna-Virilis, and in the front of the temple of Saturn, described by Labacco. In the description of the Basilica, the pluteus means the continued pedestal, intervening between the upper and lower ranges of columns. The printed copies describe the pluteus in this passage as between the upper columns, but the MSS. read, "inter superiores et inferiores columnas." It has the same meaning in the explanation given of the scene of the theatre.

proportion: that is, if the columns in front be eight times their diameter in height, these should be nine: if the exterior columns be nine or ten diameters in height, these must observe a proportionate augmentation. The difference in the bulk of the columns will not be apparent, because they are not seen contrasted with the light. If, notwithstanding, they should appear too slender, the number of their flutings may be increased. Thus, if the columns in front have twenty four, these may have twenty eight or even thirty two: so that what in fact is taken from the bulk will be apparently restored by the additional number of flutings. This optical deception arises from the idea of greater magnitude which is impressed by the transit of the visual rays over a greater surface. For if the peripheries of two circles of equal diameter, one of which is fluted and the other not, be measured with a line which is made to be in contact with every point of the peripheries, the length of the line will not be the same in both cases; because in one it has been made to touch every point in the concave surfaces of the flutings in the intervals between the striae. Since this deception therefore may be accomplished, it may be allowed to make columns which are in confined situations and little exposed to the light less massive than the others; because their want of bulk may be rendered imperceptible by augmenting the number of flutings as circumstances may require.

The walls of the cella should be proportioned to the magnitude of the building; the antae which terminate them being always as much in width as the diameter of the columns. If they are to be formed of unhewn stone, the pieces ought to be very small: but if squared stone or marble be used in their construction, the blocks should be of a moderate size and of equal length; because greater firmness is obtained when the joints of one stratum are made to meet in the middle of the blocks which constitute the stratum immediately below them. If every edge of the squared blocks be rebated, the effect produced will be much more pleasing[1].

[1] We are to understand from this passage, that the walls are intended to be of that kind of masonry which is commonly called rusticated; of which we find examples in the Poikile at Athens, and several temples at Rome. Amongst the latter may be mentioned the temples of Fortuna-Virilis and Mars-Ultor. The term *expressiones,* which Vitruvius uses to express the faces of the stone projecting before the joints, is used exclusively by himself.

## CHAP. V.

### OF THE ASPECTS WHICH ARE MOST APPROPRIATE FOR TEMPLES.

The temples of the Gods ought to be so placed that the statue which has its station in cella, should, if there be nothing to interfere with such a disposition, face the west; in order that those who come to make oblations and offer sacrifices may face the east when their view is directed towards the statue: and those who come to impose upon themselves the performance of vows, may have the temple and the east immediately before them. Thus the statues they regard will appear as if rising from the east and looking down upon the supplicants. Hence it seems necessary, that all the altars of the Gods should face the east.

But if the peculiar situation of the spot renders such a position impossible, the temple should be so situated that the principal part of the walls may be seen from it. And when temples are built in the neighbourhood of a river they should command a view of its banks, like the temples of Egypt upon the borders of the Nile. For similar reasons, temples which are erected near public streets should be situated so as to present themselves readily to the passers by, who may perform their salutations whilst they are kept in view.

# CHAP. VI.

## OF THE PROPORTIONS OF THE DOORWAYS OF TEMPLES.

The proportions of the doorways of sacred edifices and their antepagments vary according to the order of the building: for each of the orders has a style of entrance peculiar to itself. The proportions for doorways of the Doric order are determined by placing the upper part of the coronae, which surmounts the transverse antepagment, upon the same horizontal level as the lower part of the epistylia over the columns of the pronaos. The space which is intended to be left open to the air[1] is determined by making the doors equal to four parts of seven, into which the height of the temple, from the floor to the lacunaria, is divided. The height of the doors is divided into twelve parts, of which five and an half are given to the width of the opening at

[1] The printed copies read, "lumen autem hypothyri:" but the manuscripts read either hypaetri, or hipetri, for hypothyri; meaning that part of the doorway which was hypaethral, or exposed to the air. The original reading renders the meaning of Vitruvius very clear; by not adhering to which much confusion has arisen, and many conjectures have been offered as to what occupied the space between the door and the transverse antepagment. Most of the editors are reduced to the necessity of altering the text; and to make the height of the door five parts, instead of four of the seven, into which the height of the temple, from the floor to the lacunaria, is directed to be divided. Perrault, adhering to the numbers of the manuscripts, introduces a deep tablet between the transverse antepagment and the cornice above it.

the bottom: at the top it is contracted in proportion to the height of the doorways; that is, when this is less than sixteen feet the diminution of the opening should be a third of the antepagment[1]. In doorways from sixteen to twenty-five feet in height, the contraction at the top is a fourth of the antepagment; in those from twenty-five to thirty feet high, the contraction is an eighth: all doorways whose height exceeds this limit ought to have no contraction whatever. The antepagments should be a twelfth part of the height of the opening[2], and diminish at the top a fourteenth part of their width. The thickness of the supercilium[3] should be equal to that of the antepagments at the top. The cymatium of the antepagment should be a sixth part of its width, and its projection the same: it is composed of the Lesbian cymatium and an astragal.

The hyperthyrum[4] is placed upon the supercilium, and

[1] Antepagments here mean the side pieces constituting the frame in which the door is fixed: in a more limited sense it means the ornament fixed in front of the frame which we, improperly, term architraves. In this sense it is used in the description of the front of Tuscan temples, Chapter VII; where the antepagments are said to be fixed in the front of the projecting mutules.

[2] The proportion of the width of the antepagment to the opening is omitted in the manuscript copies; that which is here given is taken from the Amsterdam edition.

[3] The supercilium is termed in a preceding passage "antepagmentum superius."

[4] The hyperthyrum, as the derivation of the word evidently implies, is the ornament extending over the aperture of the doorway: it consists, as the text explains, of several members. The commentators and translators of Vitruvius have generally supposed the hyperthyrum to be a kind of plain fascia intervening between the supercilium and the members of the coronae; whereas the words of the text at the beginning of the chapter clearly indicate that the hyperthyrum comprehends all the

is equal to it in depth: it consists of the Doric cymatium and Lesbian astragal, having but little projection, together with a plain corona and cymatium. Its projection is equal to the height of the supercilium which is placed upon the antepagments. The supercilium projects beyond the antepagments on the right and left: the cymatium is continued around the projections, and is united, by means of a mitred joint, with that of the antepagments.

If the doorway is to be of the Ionic order, the height of the opening is determined in the same manner as in the Doric; but its width at the bottom is two parts of five, into which the height is divided[1]: the contraction at the top follows the rules prescribed in the foregoing instance. The width of the antepagments at the bottom is a fourteenth part of the height of the opening; the cymatium is a sixth part of the width: the remaining part is divided into twelve, of which three are given to the first corsa, or fascia, and its astragal, four to the second, and five to the third: these corsae and their astragals are continued around the opening. The

members of the coronae: " corona summa quae *supra antepagmentum* superius imponitur:" and not, " *supra hyperthyrum* imponitur." In the generality of ancient doorways, which, like that under discussion, were without ancones, no fascia is found to intervene between the supercilium and the coronae: several instances may be adduced from the ruins of Balbec and Palmyra. The reader is referred to the works on those subjects, and particularly to plates 10, 13, and 14, of the former; and plates 12, 20, 30 and 49, of the latter. Also to the doorways of the tower of Andronicus Cyrrhestes in the first volume of the *Antiquities of Athens.*

[1] For the same reason that the reading of the manuscripts, which states the proportions of the Doric opening, has been altered in the printed copies, it has here likewise been altered from "unius," to, " unius semis."

space left open to the air[1] is determined in the manner directed to be observed in Doric doorways[2].

The ancones or prothyrides, as they are sometimes called, are suspended from the coronae on the right and left of the supercilium; the lower ends, exclusive of the leaves, are in the line of the opening of the doorway. The width of the ancones is a third of the antepagment, and it is a fourth part less at the lower end than at the top.

The doors should be so framed that the scapi, upon which the hinges are fixed, may be a twelfth part of the height of the opening: the tympana are each a fourth part of the distance between the two scapi. The compartments of the doors are determined by dividing the height into five parts, two of which are given to the upper and three to the

[1] Here again, as in the Doric doorway, *hypaetra*, or *hypaethra*, is altered in the printed copies to *hyperthyra*.

[2] The printed copies here read, "quemadmodum in Doricis hyperthyridibus." The latter word is substituted for *portis pedibus*, which appears to be the reading of the manuscripts; although in some of them the last word is not clearly made out. For *portis pedibus* I have little doubt that we ought to read *portis foribus:* since in most of the manuscripts the three first letters of the word pedibus are indistinctly written. The chapter professes to treat of the three several kinds of *thyromata;* which word is synonymous with *fores portarum*. No objection to the reading here suggested can arise from the latinity of the passage; because in the manuscript copies of the author we have several instances of the use of the ablative case for the genitive; although the passages in which they occur are corrected in the printed editions. It will be sufficient for our purpose to give the following quotations: "Si enim *majoribus* symmetriis utemur in minoribus neque . . . . . . . . . . . . si autem *minoribus* in majoribus utemur," lib. VI. c. 4. where *minoribus*, in the latter part of the passage, and *majoribus*, in the first, are respectively used for *minorum* and *majorum*, scil. atriorum "*E quibus* formis certisque *corporibus* figurata . . . . . . ." lib. VII. c. 5. in which passage *quibus* and *corporibus* are put for *quarum* and *corporum*.

lower. At the line of separation the middle impages are placed: others are framed into the doors at the bottom of the lower and at the top of the upper compartment. The height[1] of the impages is a third part of the tympanum. The horizontal scapi are together half the height of the impages: the replum is two thirds of the remaining space; and the cymatium above and below occupy the other third. Those portions of the scapi which appear before the antepagments are equal in width to half the impage. If the doors are made folding[2], it will not be necessary to add to their height, but only to make their width somewhat greater; but if each folding door has two valves, the height of the doorway must be increased.

The Attic or Corinthian doorways are similar to the Doric, excepting that the antepagments have a fascia below the cymatium: the proportion which this fascia bears to the antepagment, exclusive of the cymatium, is two parts to seven. The antepagments are not to be embossed with encaustic work, neither are they to be constructed for the reception of double doors, but for folding doors

[1] Through ignorance of the method in which ancient doors were formed, the editors of Vitruvius alter *altitudo,* which is the reading of the manuscripts, to *latitudo.*

[2] Fores valvatae are folding doors. Vitruvius, having already described the proportions for single doors, proceeds to say that if the doors be made valvatae, or folding, it will be necessary that the doorway should be of greater width: the reason for which is sufficiently obvious. The bifores are double doors; that is, one door within the other, having an interval between them equal to the thickness of the wall or of the antepagments.

only: the outward parts of them appearing like apertures[1].

Thus I have explained, as far as I have been enabled to collect from the most authentic accounts, all the proportions for temples of the Doric, Ionic and Corinthian orders. The proportions of Tuscan temples remain to be described.

[1] This passage is understood in different senses by the commentators, who, for the most part, imagine Vitruvius to be here speaking of the ornaments of the doors; for which reason they interpolate the words "*forium ornamenta*" without any authority for it. The passage in the manuscripts stands thus, "Ipsaque non fiunt caelostrata, neque bifora, sed valvata," &c. The substantive to which ipsa relates, is clearly antepagmenta. The ancients had a custom of ornamenting, with encaustic work, the limina, or antepagmenta; as appears by the following line from Ausonius:

"Ceris inurens januarum limina." Epig. XXVI. 9.

The scholiast observes that there were three kinds of encaustic work in use among the Romans: one of which was burning ivory or horn with a sharp-pointed instrument, called a caestrum; whence that method was called opus caestrotum. The word caelostrotum may perhaps have been suggested by the use of a caelum, or graving instrument, for a similar purpose.

The meaning of Vitruvius appears to be that as bifores, or double doors, were not adopted, the folding doors were hung upon the interior face of the antepagments; receding from the outward face, the depth of the antepagment, or the thickness of the wall: so that the opening of the doorway was not closed on the outside, but the aperture left unoccupied. The latter part of the passage in the manuscripts stands thus, "aperturas habent exteriores partes." The printed copies insert *in* before "exteriores."

## CHAP. VII.

### OF THE PROPORTIONS OF THE TUSCAN ORDER; OF ROUND AND VARIOUS OTHER KINDS OF TEMPLES.

The area which the temple is intended to occupy should be so proportioned, that if the length be divided into six parts the width should be equal to five. The length should be equally divided into two parts, the further of which is designed for the cella, and the division in front is left to be occupied by the columns. The width being divided into ten parts, three on each side are given to the lesser cellae, or the side aisles, if such be required: the remaining four are for the width of the principal cella.

The disposition of the columns in the area before the cellae is this: those at the angles of the front are placed opposite the antae in the line of the lateral walls of the temple: two others are interposed between them in the line of the walls which form the divisions of the cellae. The columns at the angles have their positions so far distant from the antae, as to admit of two others, in the intervals, in the same lines of direction.

The diameter of the columns is a seventh part of their height, and their height a third of the width of the temple: the diminution of the shaft is a fourth of the diameter. The bases are half the lower diameter, and divided in height into two parts; the lower of which is for the circular plinth, and the upper for the torus and apophyge.

The height of the capital is likewise half the lower diameter, and its greatest extent is made equal to twice the height. The plinth, which corresponds to the abacus of the other orders, is a third of the height of the capital; the echinus and the hypotrachelium, with its apophysis[1], are likewise each a third.

Upon the columns trabes should be placed one upon another to such an height as the magnitude of the temple may render necessary; but their thickness ought not to exceed the diameter of the columns at the hypotrachelium. The beams should be joined together by means of cramps and dovetails; but an interval of two digits left between them; because if they are placed in close contact, and the air is not suffered to circulate freely between them, a fermentation takes place, and they soon decay.

The mutules should project a fourth of the height of the columns, both beyond the beams and the lateral walls of the temple; and have antepagments fixed against the projecting ends. The tympanum of the fastigium should be constructed in front, either of masonry or timber. The columen, canterii and templa should be of such proportionate heights and lengths that the eaves, formed by the projection of the mutules in the flanks of the temple, may be proportioned to the height of the roof, in the ratio of one to one and a third[2].

There are, however, various kinds of round temples:

[1] There is no mention of any astragal, in addition to the apophysis, in the manuscripts.

[2] This passage is very obscure, and is variously interpreted by the commentators.

those which are constructed with columns only, without a cella, are called monopteral, and the others peripteral. The first are raised upon a tribunal, to which there is an ascent; its height is a third of the diameter of the temple. Upon this stylobate the columns are placed, equal in height to the diameter of the tribunal, and a tenth part of their height in bulk. The epistylium is made half the lower diameter of the columns: the zophorus and the other members are determined in the manner already described in this book[1].

If the temple is to be peripteral, two steps and a stylobate are first built: then the walls of the cella, which should recede

I have ventured to give it this meaning in consequence of the manner in which Vitruvius applies the term tertiarius. In lib. iii. c. 1. it is thus introduced, "Cum facta sunt octo, quod est tertia adjecta, tertiarium." Tertiarius, therefore, signifies a quantity made up of any primary number and a third of that number.

Let us now consider what is to be the height of the roof. In general, the height of the tympanum is a ninth part of the extent of the front, measured from the extremities of the coronae; the columen, therefore, of the roof, measured from the tigna to the point where the axes, or principals, meet, is one ninth of the width of the temple, including the walls. The projection of the mutules before the walls is stated to be one fourth of the height of the columns; that is, one twelfth of the width of the temple. Hence the height of the columen, is to the projection of the mutules, in the ratio of twelve to nine; or one and a third to one: if, therefore, the projection of the mutules be a primary number, the height of the columen will be its tertiary; or, what is the same thing, the projection of the mutules will be the inverse tertiary of the roof: which is apparently the meaning of the words, "ut stillicidium tecti absoluti tertiario respondeat."

[1] By referring to the proportions already described in this book, as well as by giving an height to the columns equal to ten times their diameter, Vitruvius intended it should be understood that round temples were always to be of the Corinthian order. The printed editions alter the reading of the manuscript copies from *quarto*, to, *tertio;* thereby referring to the proportions of Ionic columns.

from the stylobate a fifth part of its diameter. A doorway is left in the middle of the walls by which the cella may be approached. The cella, exclusive of the thickness of the walls and the width of the ambulatory around, determines the height of the columns above the stylobate. The columns should be arranged around the walls of the cella at proper intervals, the proportions and symmetries for which have already been mentioned.

The height of the roof in the centre is determined by making the tholus[1], including the flower, half the diameter of the entire temple. The flower, exclusive of the pyramid, should be equal to the capital of the columns. The proportions of all other parts of these temples should be similar to those already described for temples whose forms are rectangular.

Temples of various other forms are also constructed, whose constituent parts are regulated by the same laws of proportions as those of the temples already described; although their general dispositions are somewhat dissimilar. Of this description is the temple of Castor in the Circus, Flaminius, and that of Vejovis situated between the two groves. A temple dedicated to Diana in the Aricinian grove has columns on the right and left of the humeri[2] of

[1] See the explanation of Plate XII. Sect. 2.

[2] The humeri are the angles of the temple formed by the longitudinal and transverse walls of the cella. The temple of Minerva upon the Athenian Acropolis, one of the instances to which it is thought Vitruvius intended to allude, has nothing very particular in its construction to render its form dissimilar to those described in the third book. It is true that, instead of antae, columns are introduced at the angles in front of the pronaos; the antae must therefore have been behind the columns at the angles, like those of the posticus. But the words of the passage imply, that in

the pronaos. The earliest temples, constructed like that of Castor in the Circus, were those dedicated to Minerva-Polias, one of which was built upon the Athenian Acropolis; and another at Sunium in Attica. The proportions of these temples are alike, for the length of the cella in either is double the width; and those features of the temple which are commonly in front of the cella are, in these examples, transferred to the sides[1].

the temples here alluded to we are to look for those features in the sides which, in general, are only introduced in the fronts: " et uti reliqua ex iis omnia quae solent esse in frontibus ad latera sunt translata:" which makes it highly probable that the temple upon the Acropolis, alluded to by Vitruvius, was that of Minerva-Polias, the portico of which is in the side of the temple; and there is no entrance whatever in the front. The words of the preceding part of the passage have been transposed in most of the printed copies; which, instead of the order observed in all the MSS. read as follows; " in arce Minervae et in Attica Sunio Palladis:" transposing the word Minervae from the end of the passage. If the order of the words be restored there will not be much difficulty in admitting that for " Minervae Palladis," we should read " Minervae Poliadis;" because otherwise it would appear extraordinary that the two appellations of the same divinity should be used together. The only difficulty which remains to be encountered is, that a temple of Minerva-Polias at Sunium is implied to have been formerly in existence. Of such a temple there are no remains, nor indeed any account given: but it is not improbable that there may have been two temples of Minerva at Sunium as well as at Athens.

There are, however, two MSS. in which the passage, as it there stands, may be interpreted so as to relate to one temple only at Athens. One reads, " Athenis in arce *et in Attica summa:*" and the other, " *et in Attica in summo;*" sc. *in summo Atticae.* It ought to be observed that these MSS. are the oldest of the five in the Harleian collection.

In the Greek inscription relating to the survey of this temple, which was brought from Athens by Dr. Chandler, the humeri are mentioned. They are there termed *harmoi,* which corresponds to the Latin word harmi or armi; meaning literally those parts of the shoulders to which the arms are affixed.

[1] This passage is illegibly written in the MSS. In attempting to decypher it the printed editions have introduced a term of which no satisfactory interpretation

There are some who adopt the dispositions observed in Tuscan temples in temples of the Ionic and Corinthian orders: for by removing those parts of the wall which extend from the cella to the antae, and substituting columns in their stead, there results a form of temple in which the Tuscan and Grecian modes of building are united.

Others take away the walls of the cella and close the intervals between the columns of the pteromata; thus affording a considerable width to the cella, by the addition on each side of the spaces occupied by the walls and ambulatories. In all other respects the temple remains unaltered; and hence arises another form, which has been called pseudoperipteral. This plan is adopted in temples where the constant performance of sacrifices requires considerable space: for temples consecrated to the worship of different divinities ought not to be constructed upon the same plan; because each has a mode of worship peculiar to itself.

Thus have I explained, from the works of our predecessors, the principles for the construction of temples; and have classed under separate heads their various dispositions and proportions. I have endeavoured to illustrate their different forms, and to point out in what respects they vary from each other. It follows that I should now treat of altars, and shew how they will be best adapted to the purpose of performing sacrifices.

can be given. The passage is generally printed thus: "uti *reliqua exisona* quae solent esse in frontibus, ad latera sunt translata." Turnebus proposes to read *ex his omnia*, for *exisona*. In one MS. I find it written thus; **exyſona**: which may probably be written for **exyſōnia**: that is, *ex iis omnia*; **y** being used in the same MS. for ii; and the symbol of contraction very general.

# CHAP. VIII.

## OF ALTARS.

Altars should face the east, and be always placed lower than the statues which are arranged about the cella; in order that those who come for the purpose of offering up prayers and sacrifices, may know from their different heights to what particular Deities the several altars are consecrated. The altars of Jupiter and the celestials should be raised as high as circumstances will permit; those of Vesta, Terra, and the marine Deities, on the contrary, should be low. These regulations are necessary to be observed in arranging the altars within the cella.

Having in this book explained the modes of disposition adopted in sacred edifices, in the next we shall treat of the construction of public buildings.

# EXPLANATION OF THE PLATES

TO

# SECTION II.

# EXPLANATION OF THE PLATES

TO

## SECTION II.

In comparing the proportions of the Corinthian order of architecture, as they are given by Vitruvius, with some existing monument of the same order in Greece, it would immediately occur to us that the building in which we might expect to find the nearest coincidence in the proportions of the several members, is the temple of Jupiter Olympiusa t Athens; as it is an example celebrated by Vitruvius himself amongst the four most remarkable of the temples of antiquity.

It has been erroneously supposed that this temple owed its origin to the emperor Hadrian, and the tradition has been so universally believed, that the ruins are commonly recognised by the title of the ‘columns of Hadrian.’

It would be foreign to the purpose to enter here into a formal refutation of this mistaken notion; I purpose reserving it for the subject of future discussion.

Unfortunately, however, the vast height of this temple opposes difficulties to the minute examination of its various members, not to be surmounted by the traveller possessed of no other means of obtaining access to the upper parts than such as modern Athens is capable of affording. The task, therefore, of drawing a parallel between the Corinthian order of Vitruvius and the order of this temple remains to be performed by some one who may command greater resources.

No other Corinthian building at Athens is mentioned by Vitruvius; for we cannot call the octagon tower of Andronicus Cyrrhestes an example of this order; since its characters, so far from having been preserved generally throughout the building, have only been partially introduced in the columns of the porticoes. We shall therefore pass over this building in preference to one which, although it is not noticed by Vitruvius, certainly existed prior to the period in which the Olympeium was erected; and has therefore a better claim to be considered of pure Grecian origin. The building alluded to is the Choragic monument of Lysicrates, which was erected in the street of the tripods at Athens.

## PLATE I.

### A PARALLEL BETWEEN THE CORINTHIAN ORDER OF VITRUVIUS AND THE ORDER OF THE COLUMNS OF A CHORAGIC MONUMENT AT ATHENS.

If we proceed upon the plan we have hitherto pursued of drawing a parallel between columns of equal diameters, we must suppose the shaft of the Vitruvian column to be 14" inches at the base: hence, according to the reading in the seventh chapter of this book, the height of the column will be 11′.8″.0, or ten diameters. The height of the Athenian columns is 11′.7″.65, making the difference little more than $\frac{3}{10}$ths of an inch only. The diminution of the shafts of columns which are less than fifteen feet in height, is directed to be a sixth part of the lower diameter: hence the upper diameter ought to be 11″.666 inches: the upper diameter of the columns of the Choragic monument is 11″.65 inches.

The columns being elevated considerably above the level of the ground, it is necessary, in considering the height of the epistylium, to enquire what addition to the general proportion would, on that account, have been given to this member of the entablature. Vitruvius directs us when columns are elevated to give a proportionate increase to the epistylium; without noticing the principle upon which the scale of addition should be formed. The epistylium of the Ionic entablature, when the columns are less than fifteen feet, is half the diameter, or one-nineteenth part of their height. And when the height of the column lies between fifteen and twenty feet, the epistylium is a thirteenth part. Hence, if instead of supposing the epistylium to be that which would be proportioned to columns between the first limits, we give it that height which is generally to be observed when the columns are between the second, on account of their elevation, we must increase the semidiameter in the ratio of nineteen to thirteen. This would give to the epistylium and its cymatium together an height of 11″.69 inches; which differs from that of the Choragic monument by $\frac{6}{100}$ths of an inch.

If the zophorus of the Vitruvian column be ornamented with sculpture, its height will considerably exceed that of the Athenian monument; and if we suppose it not to be so embellished, it will be somewhat less; but then the entire heights of the entablatures will nearly accord; for in this case, the zophorus being $8''.77$ and the whole coronae $11''.21$, the difference will be $\frac{54}{100}^{\text{ths}}$ of an inch only. So great a latitude has been allowed to caprice in the composition of Corinthian capitals, that we scarcely meet with two instances in which it is the same. The divisions for the leaves, as they are given by Vitruvius, agree with no example known, either of Grecian or Roman columns. As far as the description is carried, the Vitruvian capital resembles those in the arch of Hadrian, excepting in the height of the lower leaf. In our representation of the Athenian column the leaves in the upper part of the shaft are omitted; because they cannot be said to form any part of the capital; but are rather to be considered as a peculiar termination of the flutings, incidental to that degree of embellishment by which this building is distinguished.

## PLATE II.

Fig. 1. Transverse section through the roof of a temple.

This figure serves to illustrate what Vitruvius has advanced as to the origin of the ornaments adopted in Doric entablatures. From this it will not be difficult to conceive how the projection of the canterii might have suggested the adoption of mutules. In the representation of one half of the roof, the span is supposed to be very considerable; when the transtra and capreoli were used in preference to the columen.

Fig. 2. The geometrical elevation of the same roof.

It is probable that the tigna, or tyes, were at first placed over the columns only; because, unless the building was of vast dimensions, which we cannot suppose to have been the case with the early temples, no useful end would be obtained by placing them at smaller intervals. Neither is it necessary, in deducing the origin of the invention of mutules, to suppose that the canterii were placed at intervals no greater than we observe them in the entablatures of antient examples of the Doric order of architecture. It will be sufficient to shew their probable origin, without accounting for the frequency of their repetition. Hence, in this figure the canterii are supposed to occur once only in the interval between two columns.

The trabs, or beams, which were placed immediately upon the columns and antae, were notched in order to preserve the tigna in their positions: these incisions were termed cubilia by the Romans, and opae by the Greeks; whence the intervals between two were called metopae.

a......The trabs.
bb....Tigna.
cc.....Axes.
d......Transtrum.
e......Capreolus.
f......Columen.
gg...Canterii.
hh...Templa.
ii......Asseres.

# PLATE III.

## A PARALLEL BETWEEN THE DORIC COLUMN AND ENTABLATURE ACCORDING TO VITRUVIUS, AND THE ORDER OF THE PROPYLEUM.

We now proceed to consider the proportions which our author assigns to the Doric order: the result of this investigation will prove that they correspond, in many particulars, with those of the most celebrated Grecian examples.

It was evidently the intention of Vitruvius to establish a modulus for this order upon a principle different to that which determined the modulus for the Ionic. If however the number of parts into which the fronts of monotrigliph temples, whether tetrastyle or hexastyle, be as it is stated in all the printed editions, the modulus will be virtually the same; because what is the modulus in one case would be twice the modulus in the other: and by making one any multiple of the other, we do not alter the relative proportions of the several parts.

All the manuscript copies of our author make the division of the fronts different to what they are stated in the printed editions; and from these divisions we obtain a modulus differing altogether from that by which the several parts of Ionic buildings are regulated.

Here it may not be improper to remark, that this general error seems to have arisen from the idea, that, in the "opus diastylon," it was intended that the interval should be accurately equal to three diameters of the column; without considering that diastyle intervals varied from two diameters and a quarter to three: for by the words, "truim columnarum crassitudinem interponere possumus," Vitruvius means that in this particular species we may place the columns as far asunder as three diameters; without inferring that we are restricted to that particular interval. In the same manner the intercolumniations of the systyle species may vary from one diameter and an half to two diameters. Unless this be allowed, how are we to class the greater number of temples to which none of the intervals mentioned by Vitruvius accurately apply? for instance, the temple of Mars-Ultor, where the interval is two diameters and a third; the temple of Fortuna-Virilis, and the portico of the Pantheon, in the first of which the interval is to the diameter in the ratio of 2.142 to 1; and in the other, 2.095 to 1; the temple of Jupiter-Stator, wherein the intercolumniation is more than one diameter and an half; and various other temples in Greece and Rome.

It is true that the intervals in the Grecian monotriglyph examples are something less than one diameter and an half, and therefore the species is rather to be called the pycnostyle: perhaps, therefore, for *systylon* in the text we should read *pycnostylon:* a correction which the commentators could have had no difficulty in admitting; since in the second chapter of the third book, *octostylon* is, by all, substituted for *hexastylon*, in the description of the temple of Bacchus at Tios: the *ductus litterarum* does not appear to be more direct in one instance than in the other. In the same chapter a correction of a similar kind is made by all the commentators, although improperly; where the proportions of eustyle columns are said to be the same as the *diastyle*, instead of the *systyle;* which is the reading in the manuscripts.

In the example which we shall take to illustrate the principles given by Vitruvius for porticoes with the polytriglyph interval, it will be seen that the intercolumniation is to the diameter very nearly in the ratio of 2.71 to 1; and therefore the species of temple is diastyle, as the text states it to be.

The propyleum, or approach to the Athenian acropolis, is one of the few instances existing in which the Greeks increased the interval between the central columns by the width of one metopa and one triglyph more; and thus far it corresponds with the hexastyle monotriglyph of Vitruvius. But it fails in the want of equality of the other intervals, which our author insists upon as necessary when the Doric order is to be introduced divested of its defects. Hence if we compare the Doric hexastyle front of Vitruvius with the Grecian example, we must imagine the angular intercolumniations of the latter to be the same as the others; the central interval remaining unaltered. The distance between the axes of the central columns of the propyleum is 17'.10".0; and between the axes of those next to them, 11'.10".9; the extent, therefore, between the axes of the columns placed at the angles of the front, upon the supposition of equality in all the intercolumniations excepting that in the centre, would be 65'.5".6; and the diameter of the columns being five feet, the whole extent of an hexastyle front would be 70.5.6: this is to be divided, according to the MSS. copies, into twenty-eight parts, two of which are to constitute the modulus, or diameter of the column. The twenty-eighth part of this extent is 2.6.2, consequently the diameter should be 5.0.4; this differs from the true diameter by $\frac{4}{10}$ths of an inch only. So near a coincidence in the Grecian and Vitruvian proportions is scarcely to be expected; and we may be allowed to infer from it an intention, on the part of our author, of strictly following the proportions delivered down in the works of the Grecian masters. We are not to expect that the proportion of the height of the column to its diameter, as it is given by Vitruvius, will apply to the columns of Grecian buildings; because it is manifest that, with every desire to adopt the Grecian proportions, he must have laboured under a misconception of his authors, when he asserted, that the proportionate height was altered from six diameters to seven. The origin of this error seems obvious; for, in the most finished of the Grecian productions in architecture, it appears that the height of the column has indeed been increased by one diameter from the primordial proportions; but it is increased from four diameters and a half to five and a half.

If we would ascertain in what manner the divisions for the tetrastyle front, as they are stated in the manuscripts, would affect the modulus, or the diameter of the column, we have only to consider the extent which is occupied by the four central columns of the propyleum. This extent is 46.7.8, and when divided by eighteen, gives 2.7.1 for the modulus, or 5.2.2 for the diameter of the columns; which differs $1\frac{82}{100}$ inches from the diameter obtained by the division of the hexastyle front.

The diameter of the column is assumed five feet; the contraction therefore at the hypotrachelium ought to be one-sixth; hence the upper diameter of the columns, had they followed the proportions of Vitruvius, would have been 4.2.0, whereas in the propyleum it is less by $2\frac{4}{10}$ inches.

All the printed copies state that an astragal was introduced in the hypotrachelium, or neck of the column; for which, however, the manuscripts afford no authority whatever: neither is it stated that the flutings of the shafts terminated at any distance below the annulets of the capital. Acquainted therefore as we are become with the practice of the Greeks, and satisfied that the intention of our author was to pursue that practice, we are justified in supposing the flutings to have been continued through the hypotrachelium. The Grecians sometimes introduced three enchased annulets in the hypotrachelium, and sometimes only one: the great depth given to this division of the Vitruvian capital, seems to indicate that the greater number was intended to be adopted.

The epistylium is directed to be one modulus, including the taenia and guttae: but in the Doric, as in the Ionic order, we ought to suppose that proportion intended for columns whose height did not exceed fifteen feet. If the principle upon which the augmentation of the epistylium was founded, when the columns exceeded a certain height, be admitted in the Ionic order, it must necessarily obtain in the Doric. We are directed to make the epistylium of Ionic columns of the eustyle species, whose height does not exceed fifteen feet, one modulus; that is, a nineteenth part of the entire height of the column: but if the height of the column be more than twenty-five feet, the epistylium is to be a twelfth part of the height. In the latter case therefore, the modulus, or semidiameter, is increased in the ratio of nineteen to twelve. If we apply this rule to the columns of the propyleum we shall obtain for the height of the epistylium, including the taenia and guttae, $\overset{'}{3}.\overset{''}{11}.5$; which exceeds the actual height by $\overset{''}{2}\,\frac{5}{10}$ inches. The height of the triglyphs is directed to be one modulus and an half, or $\overset{'}{3}.\overset{''}{9}.0$; in the propyleum the height is $\overset{'}{3}.\overset{''}{9}.9$. In the same example the width of the triglyphs is $\overset{'}{2}.\overset{''}{4}.0$; which is two inches less than the modulus, the width which Vitruvius assigns to it.

The height of the cornice of the propyleum, including the sima, is found to have been $\overset{'}{2}.\overset{''}{0}.5$; which is less by half an inch than it would have been if formed according to the proportions of our author.

Thus we find in every particular, excepting in the height of the columns, the proportions of the monotriglyph-hexastyle front of Vitruvius correspond to a great degree of accuracy with those observed in the propyleum. The want of coincidence in the height must be attributed, as we before observed, to a misconception; which an actual observation of Grecian buildings would undoubtedly have corrected.

| | |
|---|---|
| a......Cymatium of the plinth. | k......Metopa. |
| b......Plinth. | l.......Triglyph. |
| c......Echinus. | m.....Capital. |
| d......Annulets. | n......Cymatium. |
| e......Hypotrachelium. | oo....Mutules. |
| f......Epistylium. | p......Scotia. |
| g......Taenia. | q......Corona. |
| h......Regula. | r.......Cymatium. |
| ii......Guttae. | s.......Sima. |

## PLATE IV.

### AN HEXASTYLE DORIC FRONT ACCORDING TO THE PROPORTIONS OF VITRUVIUS.

The diameter of the columns is made five feet; in order to shew the analogy between this front and another hexastyle front, represented in Plate V. which has the proportions we find to have been observed in the propyleum.

The columns are represented as less than six diameters in height.

## PLATE V.

### AN HEXASTYLE FRONT IN WHICH THE COLUMNS AND ENTABLATURE HAVE THE SAME PROPORTIONS AS THOSE OF THE PROPYLEUM.

The angle of inclination of the pediment is made the same as that of the temple of Theseus: this gives to the tympanum an height of 7'.10".2: the height of the tympanum, according to the rule for determining it, in the third chapter of the third book of Vitruvius, would be 8'.2".2.

## PLATE VI.

### A PARALLEL BETWEEN THE TETRASTYLE MONOTRIGLYPH FRONT OF VITRUVIUS, AND A TETRASTYLE FRONT, HAVING THE PROPORTIONS OF THE GATE OF THE AGORA AT ATHENS.

Fig. 1. The columns and entablature of this front have the same dimensions as those of the gate of the agora; the interval between the central columns is likewise the same: but the columns at the angles are placed immediately under the triglyphs, which makes the interval between the axes of the two columns next the angles, 10'.0".08. Hence, the diameter of the columns being 4'.4".05, the whole extent of a tetrastyle front will be 39'.4".57.

Fig. 2. Let us assume a similar extent for the front of a tetrastyle portico. According to Vitruvius, the diameter of the column should be a ninth part of the extent, or 4'.4".5; now one of the columns of the Athenian portico is 4'.4".5 in diameter: so far the coincidence is exact. The extent measured between the axes of the columns at the angles will be 35'.0".07, which divided by seven, gives 5'.0".01 for the distance from centre to centre of two adjoining triglyphs: hence the distance between the axes of the central columns

will be 1′5.0″.05; and of the others 1′0.0″.02, both of which dimensions differ very immaterially from those of Fig. 1.

## PLATE VII.

### AN HEXASTYLE FRONT OF THE DITRIGLYPH SPECIES, ACCORDING TO VITRUVIUS.

Although the Greeks, during the age of Pericles, when architecture had attained to perfection, do not appear to have adopted a polytriglyph interval between their Doric columns; in a subsequent age we have an example of such a practice in the portico of Philip, erected in the island of Delos. It does not appear to be very improbable that Vitruvius might have deduced his proportions for the polytriglyph species from some particular account of this building: for the following reasons. First, because the proportions of some of the parts correspond with those given by our author, with a degree of precision which could only be expected to result from an indirect transfer of those of the one to the members of the other. Secondly, he asserts that the antients generally avoided the use of the Doric order in sacred buildings. This assertion, whilst it affords a convincing proof that he never could have visited Greece, where it was commonly adopted, sufficiently explains that the works relating to this order, with which he was conversant, for the most part treated of profane edifices. And this is a reason why in the investigation of the Doric proportions for the monotriglyph species, we should compare them with those of the propyleum and the Doric portico above mentioned, in preference to those of any other buildings at Athens. Thirdly, because the two methods of fluting the columns, mentioned by Vitruvius, are both found to obtain in this Grecian building, I believe, exclusively.

We are directed to divide the front of a polytriglyph hexastyle portico into twenty-one parts; one of which is to be given to the diameter of the columns, and is twice the modulus. Let us assume the diameter of the columns to be 2.11.5; then the whole extent of an hexastyle front will be 62.1.5: hence the distance from centre to centre of two adjoining triglyphs will be 3.8.375, and consequently the distance between the axes of the central columns will be 14.9.5; and of the others 11.1.12. In the portico of Philip the intervals are 10.11.7; differing $1\frac{42}{100}$ only from the latter of these distances: and if we increase the interval by one metopa and one triglyph more, for the distance between the axes of the central columns, it will become 14.7.6. The whole extent, therefore, of an hexastyle front, having the same proportions as the portico, would be 61.5.9; which exceeds the extent, according to Vitruvius, by $4\frac{4}{10}$ inches. In a space of more than sixty feet this difference is scarcely to be regarded.

The distance between the axes of the two columns at the angles of a tetrastyle front, having the proportions of the same portico, would be 36.7.0; this, divided by twenty-six, according to the rule of Vitruvius, will give the modulus: the quotient arising from this division is 1.4.88, which differs from the semidiameter of the columns little more than $\frac{8}{10}^{\text{ths}}$ of an inch.

The columns being very nearly twenty feet in height, we proceed to consider what ought to be the proportionate height of the epistylium, according to the principles hitherto observed. In the Ionic order, when the columns are less than fifteen feet high, the epistylium is half the lower diameter, or one part of the nineteen into which their height is divided; in columns from fifteen to twenty feet, the height is divided into thirteen parts, one of which is given to the height of the epistylium. That is to say, in the latter case, half the diameter is increased in the ratio of nineteen to thirteen. If we pursue this rule in the example before us, the height of the epistylium would be $\overset{'}{2}.\overset{''}{1}.92$; which is greater by $\overset{''}{3}\,\frac{24}{100}$ inches than that of the portico. The proportionate height of the epistylium of this portico deviates from that which appears to have been generally observed in the best examples of Grecian architecture, such as the temples of Minerva and Theseus and the propyleum; in all of which the heights of the zophorus and epistylium are so nearly equal, that they differ only by some decimal parts of an inch. Had the equality between the zophorus and epistylium been observed in the portico of Philip, the latter would have been $\overset{'}{2}.\overset{''}{1}.9$; and thus the difference between the height of the epistylium, and the height determined by the rule of Vitruvius, would have been reduced to the fiftieth part of an inch.

The width of the triglyph is less by $\overset{''}{1}\,\frac{39}{100}$ inches than the semidiameter of the columns. It ought to be remarked that the triglyphs of the portico project before the face of the epistylium, and so far accord with the explanation given by Vitruvius of the invention of triglyphs.

In this instance, as in those already mentioned, we must be prepared to expect a difference in the proportionate height of the columns from that which is given them in the text of our author. Accordingly, instead of the height being seven times the diameter, it is found to be somewhat less than six and one-fifth. The proportions of the upper and lower diameters are, notwithstanding, nearly the same; for if the diminution of the shaft had been one-third of the modulus, the diameter at the hypotrachelium must have been $\overset{\backprime}{2}.\overset{\backprime\backprime}{5}.59$, instead of $\overset{\backprime}{2}.\overset{\backprime\backprime}{5}.3$; which is the actual diameter at the top of the shaft, in the columns of the portico.

## PLATE VIII.

### AN HEXASTYLE DORIC PORTICO OF THE POLYTRIGLYPH SPECIES, HAVING THE PROPORTIONS OF THE PORTICO OF PHILIP IN THE ISLAND OF DELOS.

The portico of Philip has no remains of a front: but several columns in one of the flanks, with their entablature, remain entire. In the flank there is no inequality in the intervals between the columns; but in designing a conjectural front, the central intercolumniation is supposed to have been wider than the others by the introduction of one triglyph and one metopa more in the zophorus.

# PLATE IX.

## DORIC AND IONIC DOORWAYS ACCORDING TO VITRUVIUS.

We are directed to divide the height, from the floor of the peristyles to the lacunaria, into seven parts. In ancient temples the lacunaria sometimes ranged with the upper part of the corona, and sometimes with the cymatium of the epistylium. In the temples of Minerva and Theseus at Athens, and of the Sybil at Tivoli, in all of which instances portions of the lacunaria are still remaining, they ranged with the corona. In fig. 1, the height from A to B is supposed to be the altitude of a temple from the upper step to the upper part of the corona; and A D the height of a column including the capital, upon the supposition that it was seven diameters in height. If A B be divided into seven parts, A C, four of them, will be the height of the doors: the remaining space *e*, between them and the supercilium, or upper antepagment, *f*, being left open to the air; or perhaps closed with bronze lattice work, like what is observed in the door-way of the Pantheon at Rome. The width of the door-way at the bottom is five parts and a half of the twelve into which A C is divided. The hyperthyrum *g*, is fixed upon the upper antepagment, and is equal to it in width.

In framing the doors, their height is divided into five parts; three of which are for the lower impages with the tympanum, or pannel, and two for the upper. At the division the intermediate impages, *aa*, are framed; the others, *bb*, are framed one below and one at the top. Each impage ought to be one-third of the tympanum; if therefore the lower division of the door be subdivided into five parts, the height of each of the impages will be equal to one of these parts. The impages in the upper division are supposed equal to those in the lower. The replum *d*, is two-thirds of the impage.

Fig. 2. An Ionic door-way.

The space left open to the air is determined in the same manner as in door-ways of the Doric kind. The width of the door-way at the bottom is two parts of the five, into which the whole lumen, or space between the floor and the supercilium, is divided. The Ionic door-way differs from the Doric by having ancones, or prothyrides, below the hyperthyrum.

Fig. 3. Plan of the door and the antepagments.

The scapi cardinales, or the styles on which the hinges are fixed, are a twelfth part of the whole aperture. Each of the tympana is a fourth of the width of the door-way, and the scapi are made to appear as much before the antepagments as is equal to half an impage; the rest being concealed by the antepagment: this method of division will leave a similar width for each of the middle scapi, in conformity with the description of Vitruvius. The compartments of the frame work resemble those of the doors in the pronaos of the Pantheon; excepting that, instead of the two intermediate impages of the Vitruvian doors, these have but one.

The door-ways and doors, as they are here represented, are altogether different to any described by preceding commentators.

## PLATE X.

### PLAN AND ELEVATION OF A TUSCAN TEMPLE.

The length of a Tuscan temple is made a fifth part greater than the width: it is divided into two parts, one for the cella and the other for the pronaos. The width is divided into ten parts, three of which are left on each side, either for the lesser cellae, as shewn at *a*, or for alae, or aisles, as at *b*. The remaining four are given to the middle cella *c*. Columns, *dd*, are placed at the angles, in a line with the antae which terminate the outer walls; and others, *ee*, between them, ranging with the walls which form the divisions of the cellae.

The columns are made a third of the whole width of the temple; beams, framed together, are placed upon them, and serve for the epistylium and zophorus. The width of these beams is equal to the upper diameter of the columns: nothing is said of their height: they are here supposed to have been square. The mutules project before the face of the beams one-fourth of the height of the columns. The tympanum of the fastigium rises a ninth part of the whole extent of the front: the general rule for determining the height of the tympanum is to divide the whole extent, comprehended between the extreme points of the corona;

but the general simplicity of the temple not admitting of a corona, the height must be determined from the extent of the front.

## PLATE XI.

Fig. 1. Plan of a monopteral temple.

The order of architecture to be adopted in round temples is not mentioned by Vitruvius; but from the proportions he gives to the columns it may be inferred that the Corinthian was meant: we are directed to make the height of the column ten times the diameter, which proportion, supposing when no other interval between the columns is mentioned that the eustyle is intended, implies the adoption of that order. The temple of Vesta at Rome, that of the Sybil at Tivoli, and the Choragic monument at Athens, are the only instances existing of round temples, and they are all of the Corinthian order. The Pantheon and the temple of Minerva-Medica do not come within that description of temples of which our author is speaking; for they are neither peripteral nor monopteral. It is however to be observed, that the portico of the first is Corinthian. Montfaucon mentions a round temple described by Flamminius Vacca, which was pseudo-peripteral and of the same order. A round temple of Mars-Ultor is exhibited upon the reverse of some medals of Augustus; where the columns are also represented with Corinthian capitals.

Fig. 2. Plan of a peripteral round temple.

The number of the columns, which form the peristyles of temples of this description, is not mentioned: the temple of

Vesta at Rome has twenty; that at Tivoli eighteen. In the plan before us the number is made sixteen, in order to allow of the eustyle interval between the columns.

## PLATE XII.

### ELEVATION OF A MONOPTERÂL TEMPLE.

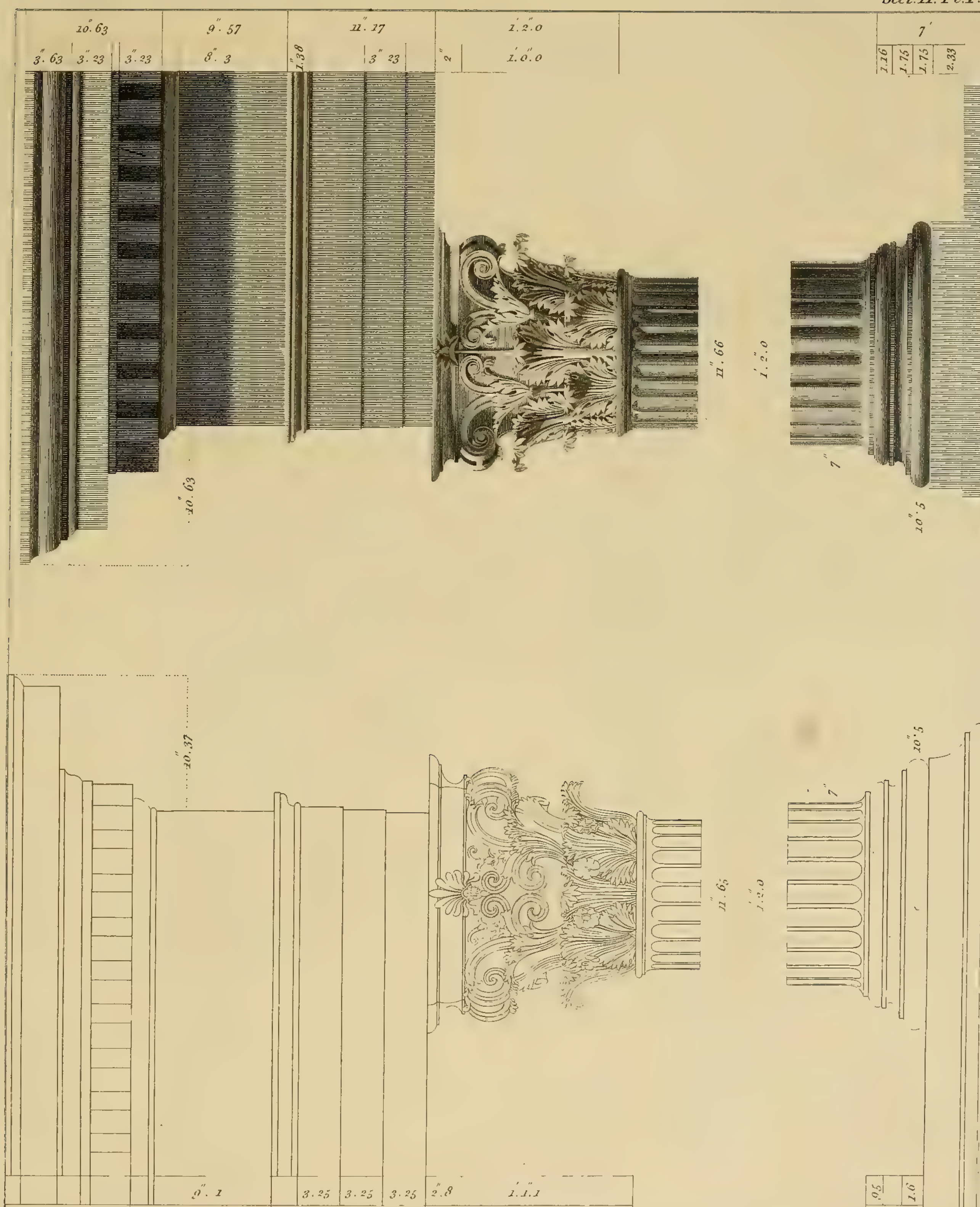
The tribunal, or stylobate of the temple, is one-third the whole diameter. The width of the ascent is made equal to the interval between the columns; which would be sufficient when the columns were wide asunder, or when the temple was upon a large scale. Vitruvius speaks of the tholus in such vague terms, that many are at a loss to know to what part of the building the term is applied. Some have imagined that the tholus means the whole superstructure above the entablature; but De Laet, one of the most elaborate of the commentators, rejects this interpretation; because of the great height it would have, if made to rise half the diameter of the whole building. In a monopteral temple, where there were no walls, the tholus may be presumed to mean the whole of the dome above the columns; in which case half the diameter would afford a just proportion for the height of the roof.

Vitruvius is silent as to the exterior form of the roof, which is here supposed to be conical; like that of the Choragic monument. The pyramid was probably a portion of the roof near the vertex, which, if the plan of the roof had been an octagon, like that of the tower of Andronicus Cyrrhestes, might very properly have been called a pyramid. This will be better understood by referring to the section of that building given in the first volume of the Athenian Antiquities. The lower part of the flos, or flower, which alone remains, resembles the lower part of the capitals of the columns: whence it is probable that the flos was nothing more than a Corinthian capital. Vitruvius gives it the same height as the capital of the columns.

## PLATE XIII.

### SECTION OF A PERIPTERAL ROUND TEMPLE.

This plate represents the section of a temple, the plan of which is given in Plate XI. The dome is an hemisphere, rising from the level of the cornice of the temple, like that of the Pantheon. If the tholus be equal in height to half the diameter of the entire temple, it must include more than the hemisphere: probably in the height of the tholus was comprehended all that part of the superstructure which rose above the level of the columns, the pyramid and flower excepted, as we suggested in the explanation of the last plate. In the Pantheon the hemisphere springs from the principal corona; which is below that of the superstructure. From the existence of a second fastigium, rising above that of the portico, from the level of the principal corona, I am induced to join in an opinion, which is very prevalent, that the portico alone was an addition by Agrippa to a building of an earlier date: and that the superior fastigium belonged to the ancient front.

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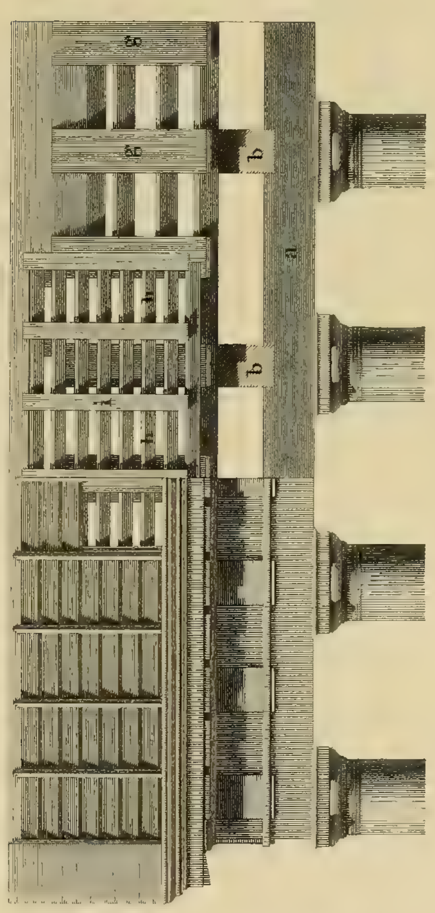

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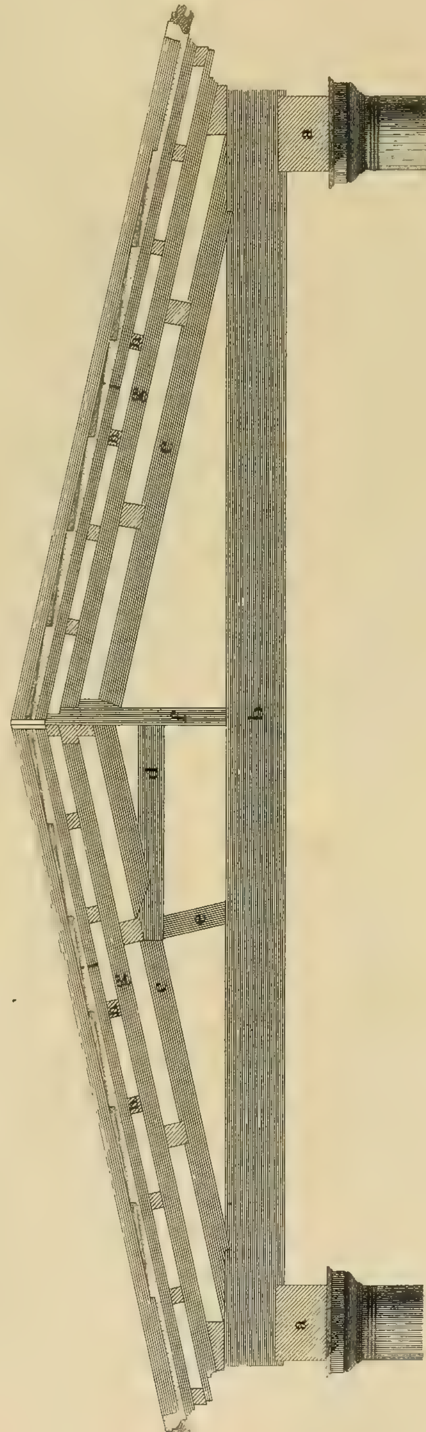

*Fig. 1.*

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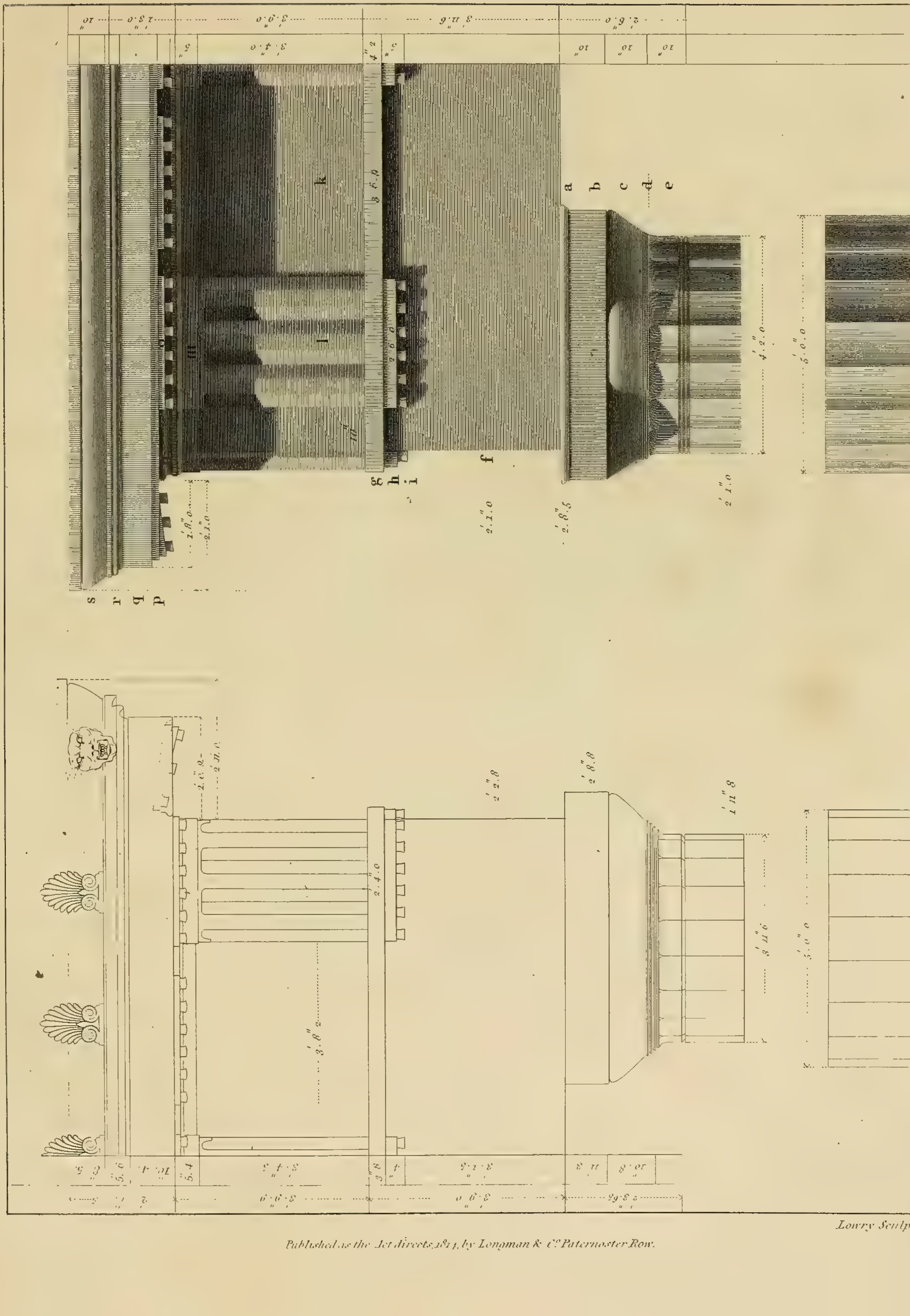

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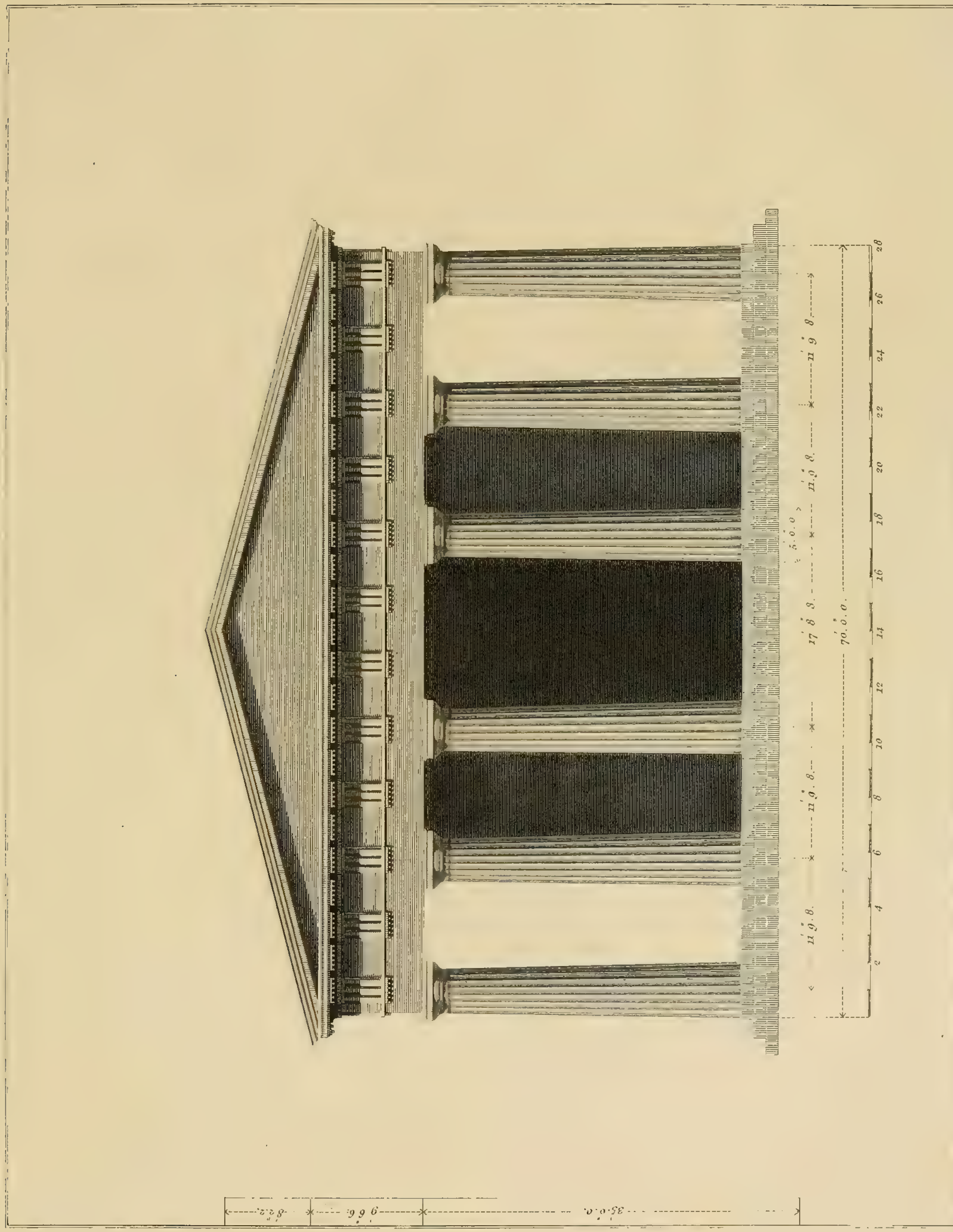

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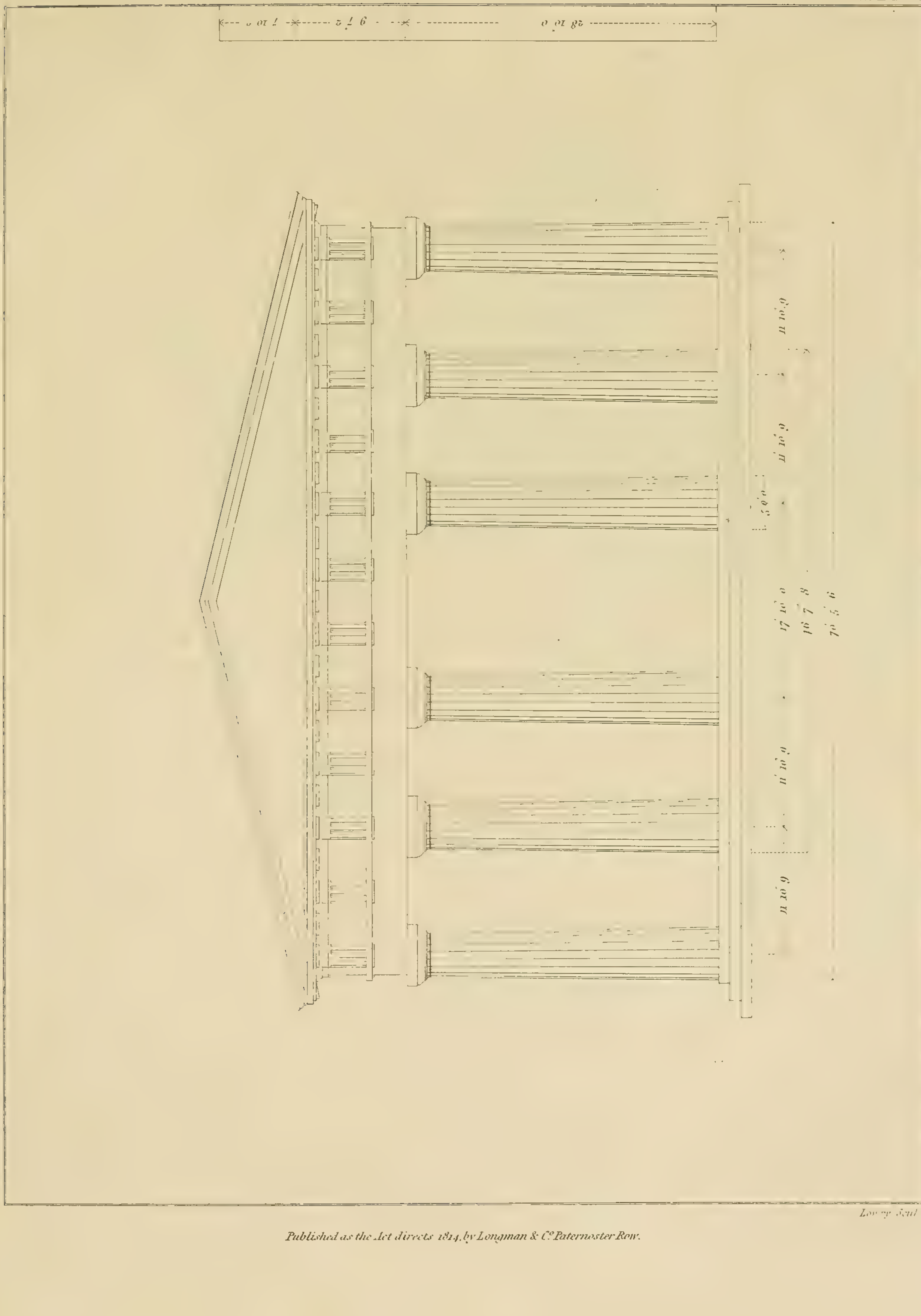

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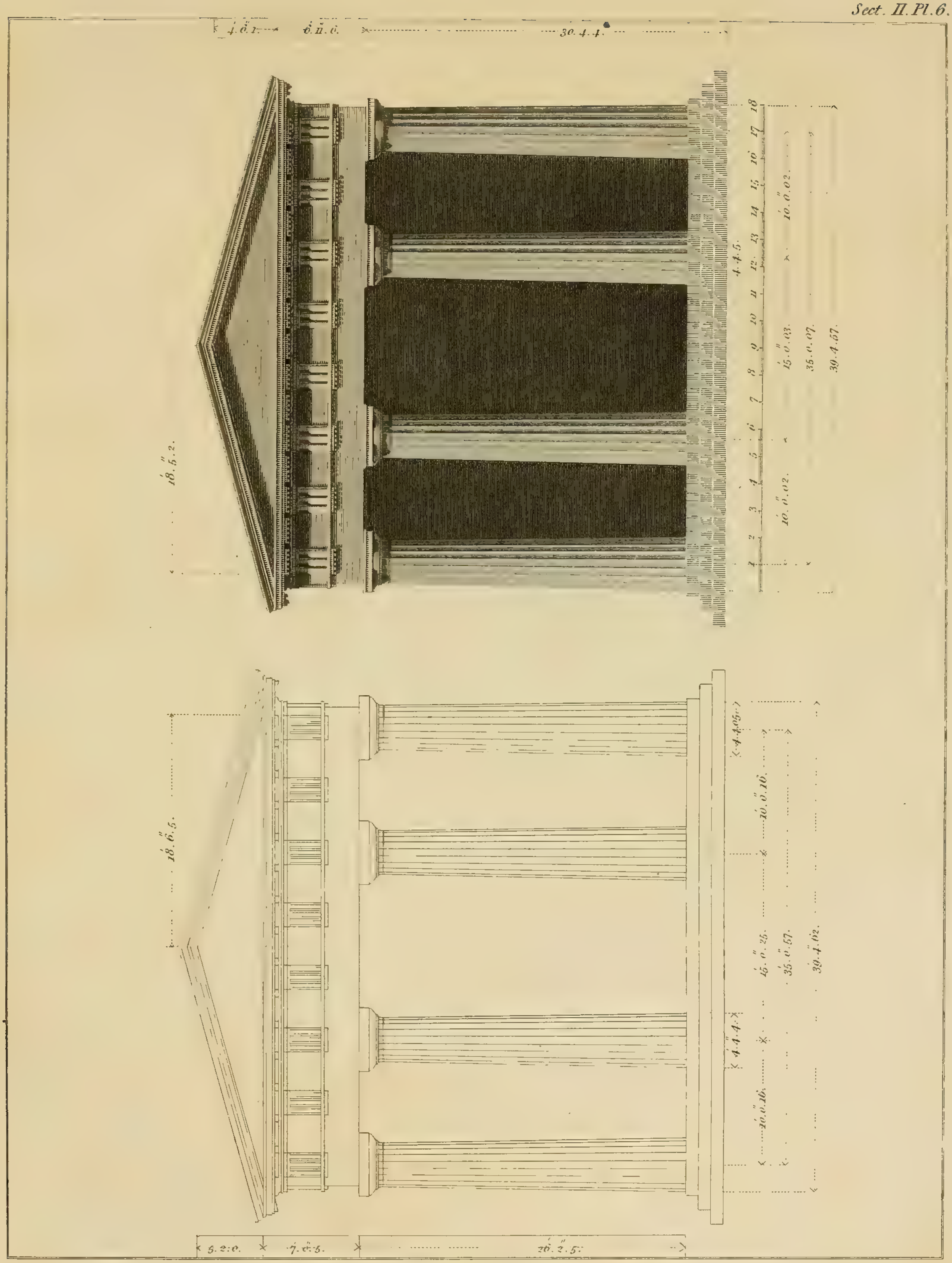

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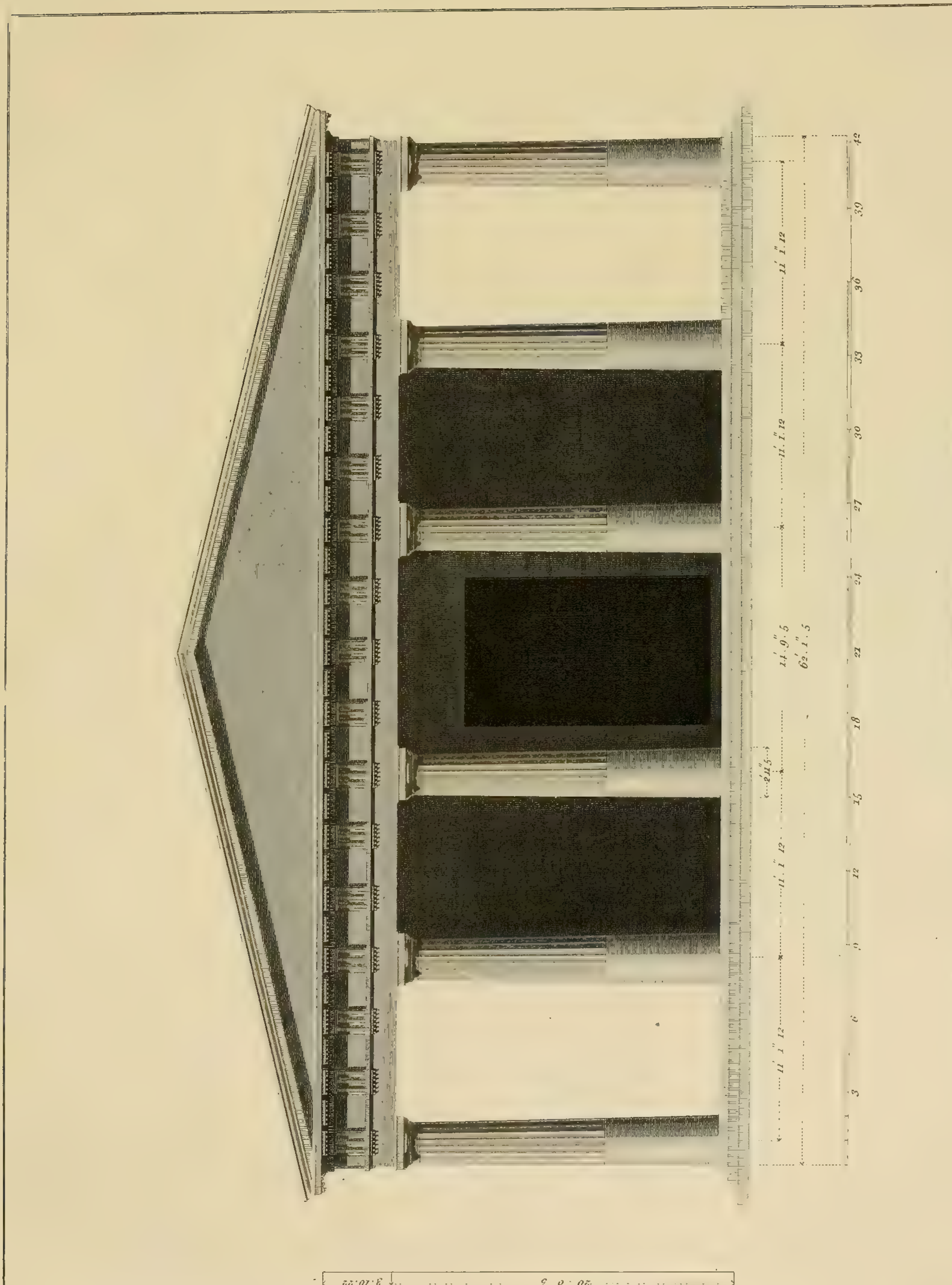

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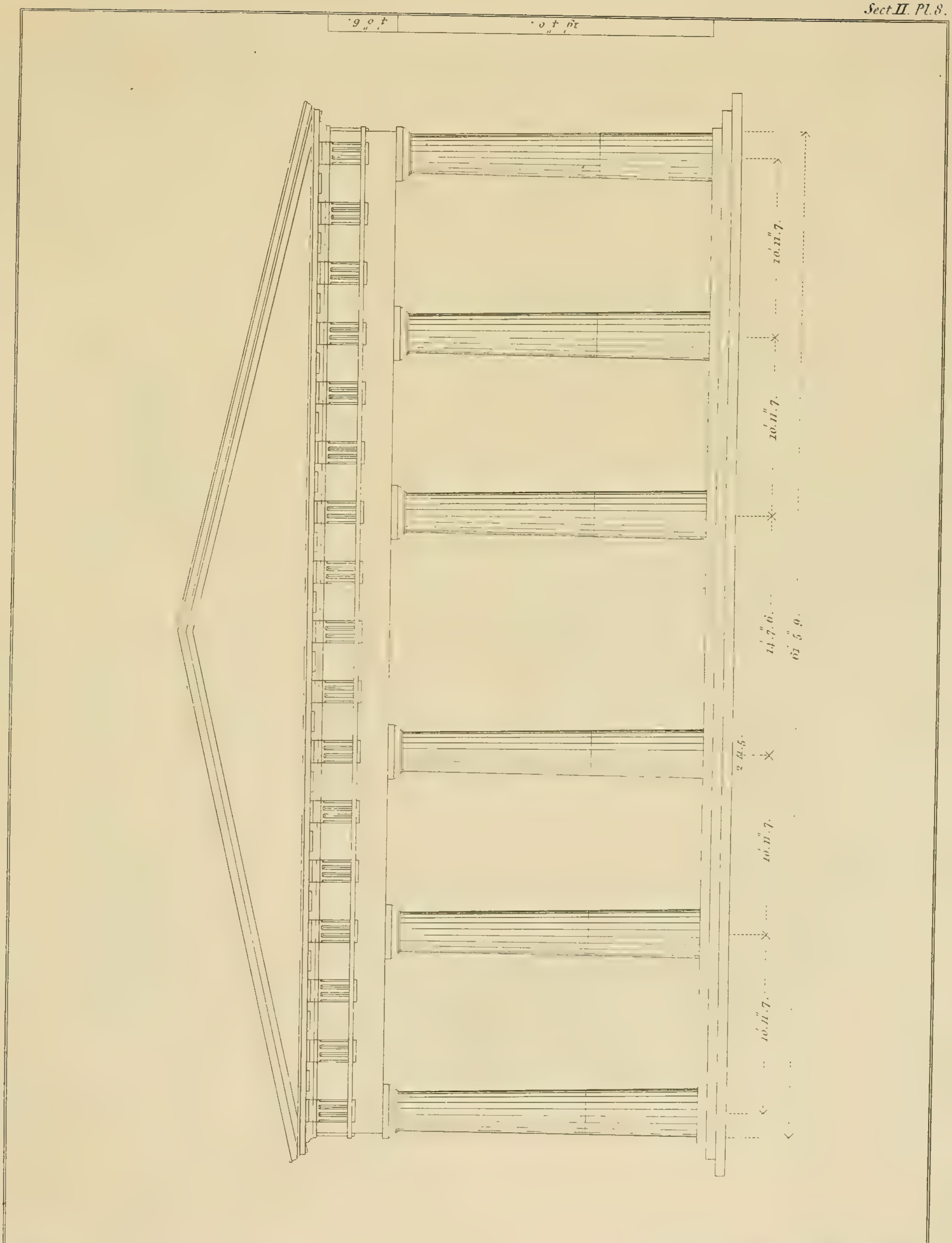


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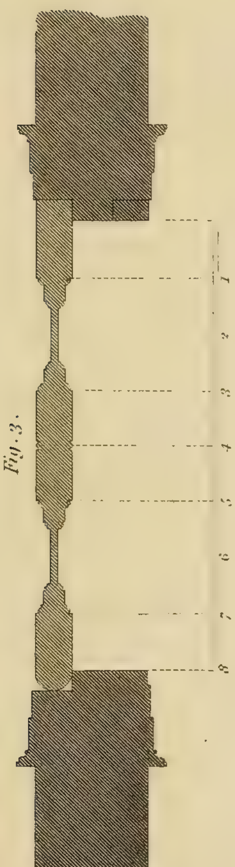

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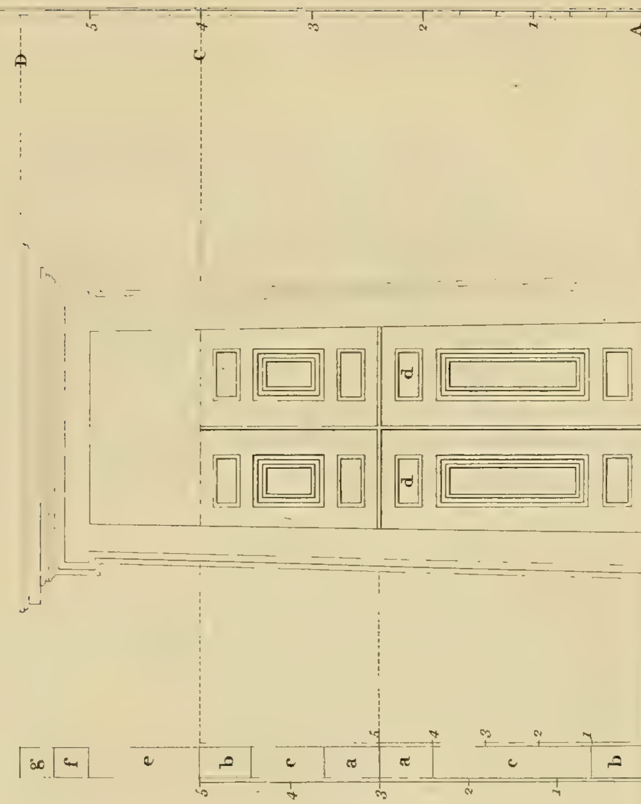


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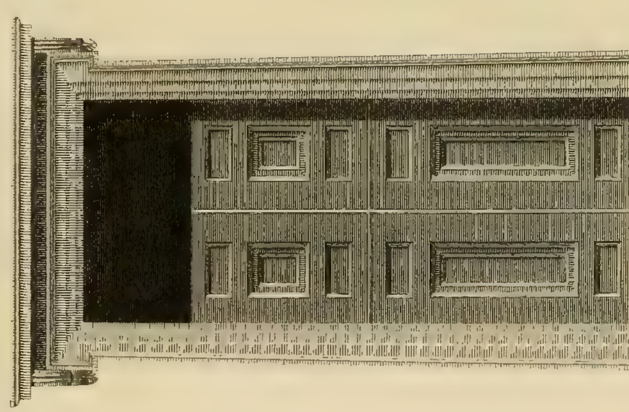

Fig. 2.

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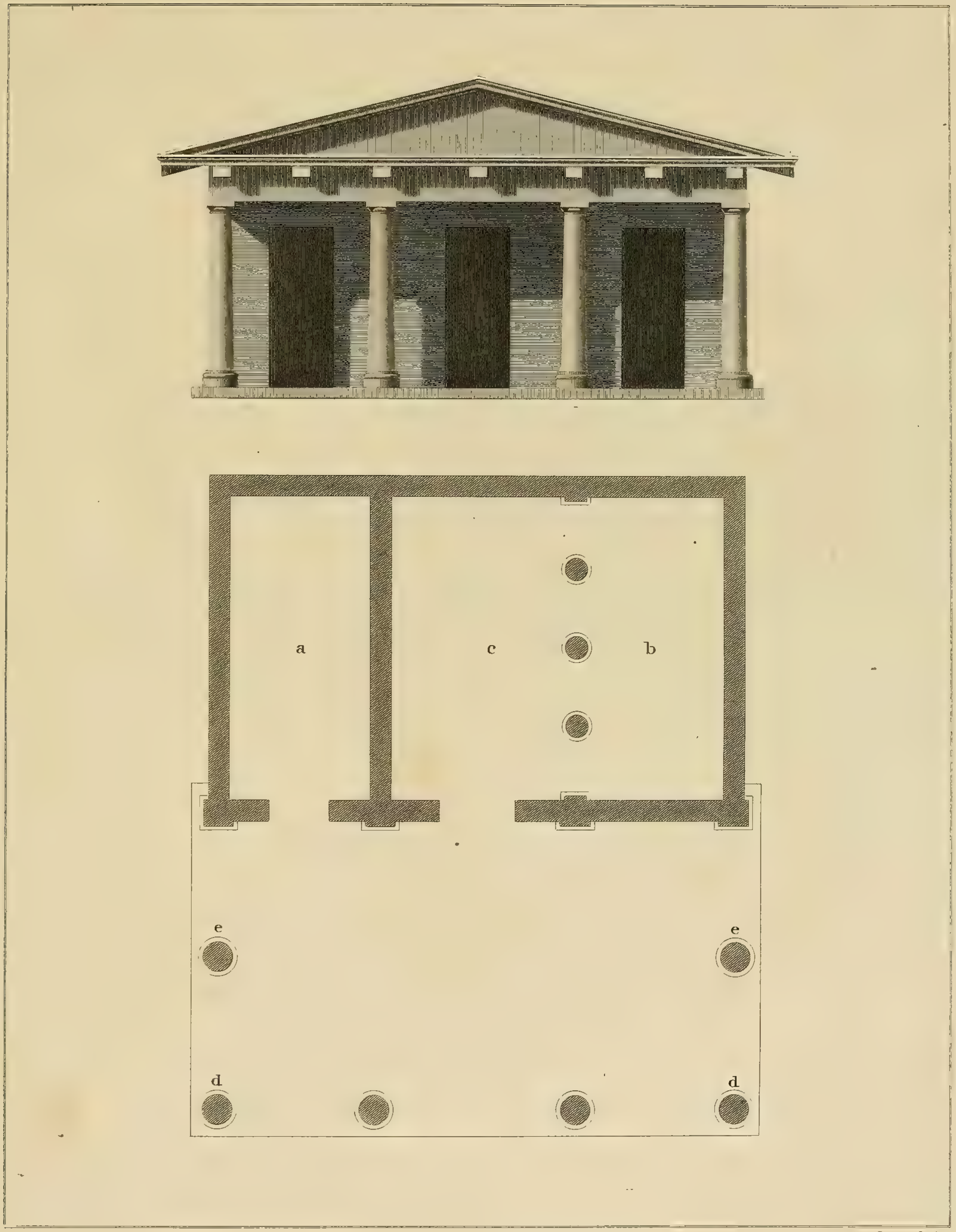


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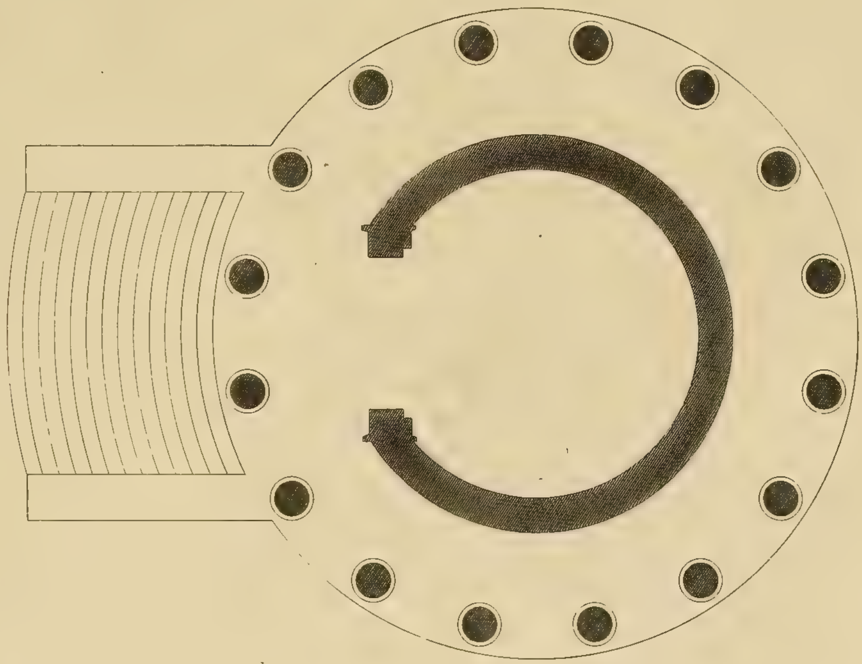

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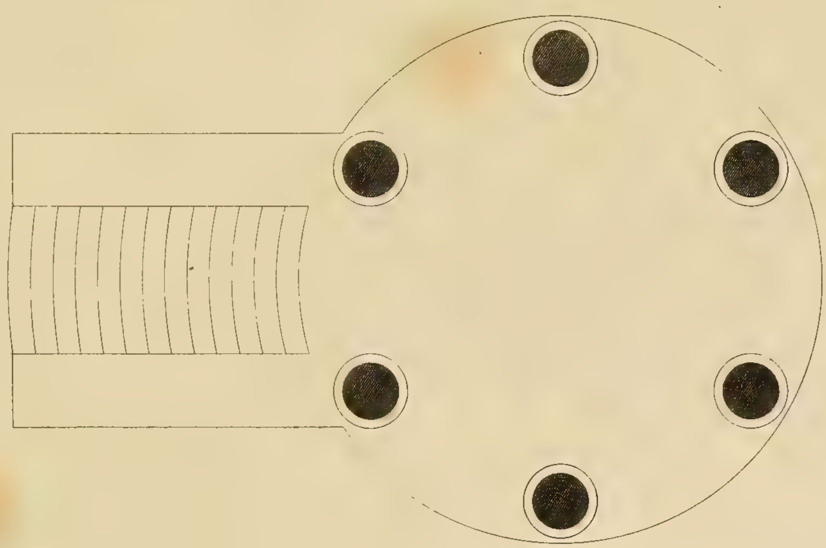

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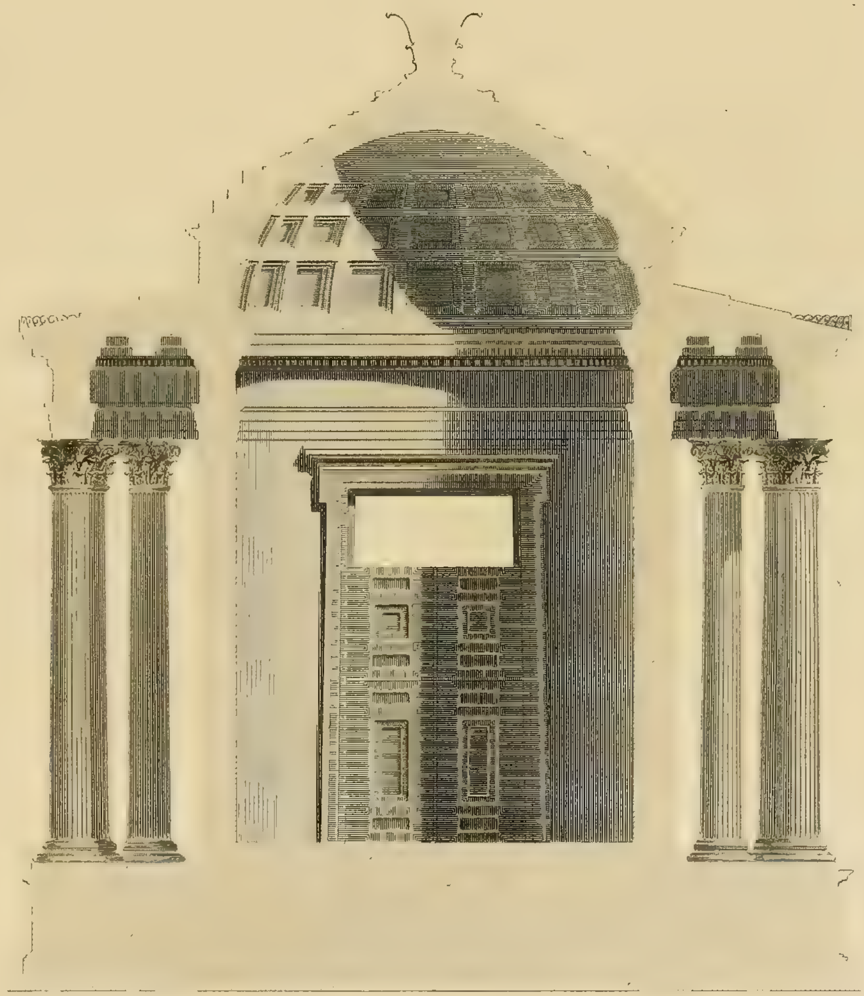
S. Porter. sculp.



S. Porter, sculp.

THE

# CIVIL ARCHITECTURE

OF

# VITRUVIUS.

## SECTION III.

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# CIVIL ARCHITECTURE

OF

# VITRUVIUS.

## SECTION III.

## CHAP. I.

### OF THE FORUM AND BASILICA.

THE Greeks build their forum with spacious porticoes, two tiers in height, arranged in a square form: the columns of the porticoes are placed at small intervals from each other, supporting stone or marble entablatures: and galleries are made over the lacunaria of the lower porticoes as places of exercise. But in Italy the mode of constructing the forum is different; because by a custom, sanctioned by its antiquity, the shew of gladiators is exhibited there; and therefore the intervals between the columns surrounding the area are made greater. The lower porticoes are occupied by the offices of the bankers, which situation is calculated to facilitate the management of the public revenue; and the upper contain seats for the spectators of the diversions in the forum.

The size of the forum must be regulated by the population of the place; so as not to be too confined, nor yet so large that much of it may appear unoccupied upon public occasions. The proportion of the length to the width ought to be as three to two; because an oblong form is best adapted for viewing those exhibitions which take place in the forum.

The columns of the upper porticoes should be a fourth part less than those of the lower; because these, supporting a greater weight, require to be more massy than those above: moreover, such a diminution is consistent with the laws observed by nature in the formation of trees; such as the fir, the cypress, and the pine; which are universally larger at the base than at any other part of the bole, from whence they gradually diminish to the top. Instructed therefore by the example which nature affords us in the shape she has given to trees, we are taught, when columns are placed tier upon tier, to make the upper less in height and bulk than those below them.

The basilica ought to be contiguous to the forum, and on that side of it which is the least exposed; so that the merchants who meet there to transact business, may not be inconvenienced by the cold in winter. The width of the basilica ought not to be less than the third, nor more than the half of its length; unless we are compelled by the nature of the situation to adopt a different proportion for the building. If the site will permit, the chalcidica[1] should be situated at

[1] The use of the apartments which Vitruvius terms *chalcidica*, is not explained. There are some grounds for supposing, that they were intended to receive grain sufficient for a certain periodical consumption. In the Roman provinces the pro-consul had the disposal of the corn: the situation of the store-rooms, at the end

the ends in a manner similar to what has been observed in the basilica of Julia Aquiliana. The height of the columns should be equal to the width of the porticoes, which ought to be a third of the distance between the columns, measured across the basilica. The upper columns, in conformity with what has already been observed, must be less than those below. The pluteum, between the upper and lower ranges of columns[1], should be a fourth part less than the height of the columns of the upper range; for by giving it such a depth, those who are walking in the galleries above will not be seen by the merchants from below. The epistylia, zophori and coronae must be proportioned to the columns according to the principles already explained.

of the basilica, would, on that account, be appropriate. The corn when first collected was deposited in pits, from which the air was carefully excluded; by which means it might be preserved for years. This method of preserving corn is still prevalent in the eastern parts of Europe. Ausonius, in perioch. Odys. XXIII, makes the *chalcidica* agree with the ὑπερῶϊα, or chambers in the upper story of the house; in which part of the country houses of the ancients were the rooms for stores and provision. These might be distinguished by the term *chalcidica*, from a certain kind of cement or plaster used in their construction. We learn from Varro, that the *creta chalcidica* was celebrated for the virtue it possessed of preserving grain; R. R. i. 57. i. The term *chalcidica*, is used by Ausonius, Arnobius and Hyginus, to signify all the rooms in the upper part of the house; although it might have been first applied exclusively to those in which grain was preserved. Hence it seems reasonable to conjecture that it might be transferred to any place in which corn was kept.

[1] The MSS. read " Pluteum quod fuerit inter superiores et inferiores columnas." The printed copies omit the word " inferiores." It is evident from the description of the scene of the theatre, c. 7. that the pluteum was here intended to allude to some member, intervening between the upper and lower ranges of columns; similar to the continued podium which we observe between every two ranges of columns in the exterior of Roman theatres and amphitheatres.

No general disposition of parts can be better calculated to produce grandeur and beauty in a basilica, than that I have adopted in constructing a building of this nature in the Julian colony of Fanestrum; the dimensions and proportions of which are as follows. The roof, over the area surrounded by the peristyle within, is an hundred and twenty feet in length, and sixty in breadth. The width of the porticoes, measured from the columns of the peristyle to the walls of the building, is twenty feet. The columns, which are not intersected by horizontal lines, are fifty feet in height, and five feet in diameter: behind them pilasters are placed twenty feet in height, two and a half in width, and one and a half in thickness; these support the wood-work of the floors of the porticoes: over these similar pilasters are placed, eighteen feet in height, two feet in width, and one in thickness, supporting the roofs of the porticoes, which are below the principal roof. The spaces between the horizontal beams of the columns and pilasters are left open in order to admit light into the building through the intervals between the columns. Four columns, including those at the angles, support each end of the principal roof; and eight, that side of it which is next the forum: on the opposite side there are only six; the two central columns being omitted that they might not impede the view of the pronaos of the temple of Augustus; the front of which ranges with the wall of the basilica, and faces the middle of the forum and the temple of Jupiter.

There is a tribunal in this temple whose front is made to recede inwardly in a curve, which is less than half the periphery of a circle: its extent from one extremity to the other is forty-six feet; the middle point recedes fifteen feet: so that the commercial transactions of the basilica do not interrupt the administration of justice. Epistylia, formed of three beams, each two feet square, are placed upon the columns, and are continued from those which are the third in order from the angles, over the antae; which project forward so as to touch the extremities of the circular tribunal. Pilae, serving as props, three feet in height and four feet in width, each way, are placed immediately over every column; these support other beams, formed of two timbers two feet square, strongly connected, which are fixed lengthways over the columns. Over these are placed transtra and capreoli, extending across from the opposite columns of the basilica, as well as from the antae and the walls of the pronaos; supporting, in one direction, the ridge of the roof of the basilica, and in the other that of the temple, which is continued over the middle of the pronaos. This disposition, which requires the introduction of pediments in both directions of the roof, gives great grandeur to the exterior of the building; and adds to the internal beauty, by giving the appearance of an extended ceiling. By departing from the mode usually practised of introducing ornaments in the entablature, and by omitting the pluteum and the second tier of columns, much of the labour of building is spared, and a considerable part of the expence avoided: whilst the columns extending from the floor to the beams of the roof, uninterrupted by horizontal lines, give great magnificence and dignity to the edifice.

## CHAP. II.

### OF THE DISPOSITION OF THE TREASURY, PRISON, AND CURIA.

The treasury, prison, and curia, should be contiguous to the forum, and their several dimensions proportioned to it. The curia, more especially, ought to be built with a magnificence consistent with the importance of the municipality or city in which it is erected. If the plan of the building be a square, the height ought to exceed the width by one-half: but if it be a parallelogram, the height of the building from the floor to the lacunaria should be half the sum of the length and breadth. The walls, moreover, ought to be intersected by a corona, either of wood-work or stucco, which should be continued around the building at half its height from the floor; for without this precaution, the voices of those who are debating would ascend to the upper part of the court and be lost to the audience. But when coronae are introduced and continued along the walls, the sounds will be interrupted in their ascent, and be distinctly heard before they are dispersed in air.

## CHAP. III.

### OF THE THEATRE, AND THE MOST HEALTHY SITUATION FOR IT.

After the site of the forum has been determined, the next care is to select the most healthy spot within the limits of the city for a theatre; in which sports may be exhibited on days devoted to the celebration of sacred rites. For those who frequent them in company with their families, engaged by the interest they take in the representations, remain in fixed attention; whence it happens that the pores of the body are exposed to the effects of the atmosphere; which in the neighbourhood of marshes, or spots otherwise unhealthy, is charged with vapours prejudicial to the human frame. This inconvenience may be avoided if the situation be chosen with care and circumspection. It is no less necessary that the theatre be not placed with its concave part facing the south; because, from its peculiar form, the sun would heat every part alike and prevent the circulation of air; which becoming rarefied and heated, causes the evaporation and exhaustion of the corporeal juices. On these accounts unwholesome situations must be avoided, and healthy spots carefully selected.

If the situation chosen for the theatre be in the side of a hill, the substructure will be formed with little labour; but if we are compelled by circumstances to build a theatre in a plain, or on marshy ground, the foundations and substructure must be made in the manner already described for those of sacred edifices. Upon the substructure, the rising steps may be constructed either of stone or marble. The number of praecinctions must be proportioned to the capacity of the building: their height should be equal to the width of the passages which they form around the theatre; for were they made higher, the sounds would not be heard with distinctness by those in the seats above them; but be interrupted in their ascent, and reflected back from the upper part of the theatre. The method of arranging the seats is determined by extending a line from the uppermost to the lowest, and making the angles of all the intermediate steps to touch it. In theatres thus constructed the propagation of sound will not be interrupted.

The approaches should be numerous and spacious; nor should those from the upper and lower parts of the theatre have any communication, but the passages to every part be direct, and without deviations; that when the representations are ended, the audience may retire with facility from all parts of the theatre, and not be subjected to the pressure of the multitude.

We must also be careful in observing that the situation chosen be not calculated, through local circumstances, to check the dilation of sound; but, on the contrary, be such as to permit the free expansion of the human voice. This is the property of those places in which there is nothing to interrupt the vibrations of the air: for sound is a subtle fluid, acting upon the organs of hearing by the vibration of the particles of air, which are put in motion, and expand themselves in an infinite succession of circles; similar in effect to that which takes place upon the surface of water, previously at rest, when a stone is cast into it: we may observe that a number of concentric circles are generated, which are constantly enlarging until circumscribed by the narrowness of the stream, or some obstacle which prevents their perfect formation: for when the undulations meet with interruption, the first that recoil resist the progress of those which follow in succession. The air is put in motion by sound in a similar manner, with this difference, that the undulations of the water are made in a plane surface; whereas in air they ascend as they extend themselves.

Thus it is with the voice; when no obstacle interrupts the first undulation, the next and those following are perfect; and make distinct impressions upon the sense of the spectators who are in the upper, as well as those who are in the lower seats; without reverberating.

The architects of former days, therefore, made use of a form in the auditory of the theatre, adapted to the configurations of air arising from the expansion of sound; and by the application of physics to the science of music, succeeded in effecting that the sounds which were uttered from the stage were conveyed to every part of the theatre, clearly defined and better modulated. For as musical instruments are formed of thin plates of metal or horn, with a view to produce distinctness in the tones of the chords, so the principles upon which the theatres of the ancients were constructed, and which were calculated to increase the powers of the voice, were deduced from the elements of harmony.

## CHAP. IV.

### OF HARMONY ACCORDING TO THE DOCTRINE OF ARISTOXENUS.

Harmony is the literature of music; obscure and difficult, particularly to those who are unacquainted with the Greek language: because in our explanation of it we are obliged to make use of Greek terms, some of which have no corresponding appellations in Latin. I will therefore offer the clearest explanation I have been able to collect from the writings of Aristoxenus; which, by subjoining his scale and pointing out the definitions of the notes, will enable my readers, by due attention, to obtain a competent knowledge of the subject without much difficulty.

The modulations of the voice are sometimes acute or sharp, at others grave; and take place in two manners; either in a continued sound, or at intervals. The continued sound of the voice is not defined by any measures of time or place; but renders the endings of the notes imperceptible; whereas intervals between notes are very evident; as when we pronounce, in common speech, the words, sol, lux, flos, nox. Not only are the beginnings and endings of its notes difficult to perceive, but the changes from treble to bass and from bass to treble are not apparent to the ear. The reverse is the case in that species which proceeds by intervals: for when the voice makes different inflexions, it stops to produce a certain determinate sound; then another, and by doing this backwards and forwards appears variable to the ear; as when in singing we produce a variety of modulations by the inflexion of the voice. Hence, when it proceeds by intervals, the beginning and end of its notes appear in the clear distinction of sounds: whereas the intermediate notes, lying wide by intervals, are distinguished with great difficulty.

The kinds of modulation are three. The first is that which the Greeks term *harmonia*, the second *chroma*, and the third *diatonon*. The modulation of the enharmonic scale is artificial; and, for that reason, its music has considerable effect. The chromatic, from its insinuating construction and the frequency of its tones, excites a more delightful sensation. But the intervals in the diatonic, which is the natural scale, are more easy. The disposition of the tetrachords are different in the three kinds, inasmuch as the enharmonic tetrachord has a ditone [1] and two dieses. Now a dieses is the fourth part of a tone; so that two dieses form one semitone. In the chromatic, two semitones succeed each other; and the third interval is of three semitones. The diatonic consists of two continued tones; and a semitone completes the tetrachord.

Thus in all three scales the tetrachord is equally composed of two tones and a semitone; but the tetrachords when considered separately as belonging to each of the

[1] Perrault reads for "et tonos," *ditonum;* and for "harmonia tetrachordorum," *harmoniae tetrachordum,* both of which corrections appear to be necessary to the sense of the context.

kinds, have different appellations for their intervals. It would appear that nature has discriminated the intervals of tones, semitones, and tetrachords in the voice, and defined their boundaries by certain measures; namely, by the quantity of intervals; and by means of certain distinct moods, has fixed their properties and proportions: according to the standard of which the makers of musical instruments construct them, so as to be adapted for concert.

To each species there are eighteen sounds, which the Greeks term *pthongoi;* of which eight are invariable and fixed in all three scales: the remaining ten are moveable in ordinary modulation. The fixed are those which are interposed between the moveable sounds, and serve to unite the tetrachords; these are permanent within their own limits in all the distinctions of the three scales. Their appellations are as follows: proslambanomenos, hypate-hypaton, hypate-meson, mese, nete-synemmenon, paramese, nete-diezeugmenon, and nete-hyperbolaeon. The moveable are disposed in the tetrachord between the fixed, and change their places with the change of position, or of the kind of music. They are called parhypate-hypaton, lichanos-hypaton, parhypate-meson, lichanos - meson, trite - synemmenon, paranete-synemmenon, trite-diezeugmenon, paranete-diezeugmenon, trite-hyperbolaeon and paranete-hyperbolaeon. Those sounds which are moved change their natures, for their intervals are increased. Thus the parhypate, which in the enharmonic scale is only a quarter-tone removed from the hypate, in the chromatic differs by a semitone, and in the diatonic by a tone. The sound which is termed lichanos differs from the hypate, by a semitone in the enharmonic, two hemitones in the chromatic, and three in the diatonic scale.

The ten sounds by reason of their transposition into the different scales, produce a threefold variety of modulation.

The tetrachords are five in number: first, the grave, which the Greeks term *hypaton:* secondly, the middle, which is termed *meson:* thirdly, the conjunct, termed *synemmenon:* fourthly, the disjunct, termed *diezeugmenon:* lastly, the most acute is called in Greek *hyperbolaion.*

The concords natural to man, which are termed in the Greek *symphoniai,* are six in number: these are the diatessaron, the diapente, diapason, the diapason with a diatessaron, the diapason with a diapente, and the disdiapason[1]. Their appellations are derived from the number of intervals: thus, when the voice, after resting upon any particular note, rises to the fourth from it, the chord is called diatessaron: when it rises to the fifth it is called diapente: to the eighth, diapason: to an octave and a half, diapason with diatessaron: to a ninth and a half, diapason with diapente: to a fifteenth, disdiapason. For neither in vocal nor instrumental music will the second, third, sixth, or seventh form a concord; but, as I have

[1] That is, the fourth, fifth, octave, eighth with a fourth, eighth with a fifth, and the double octave. This account of the concords is very different from the principles of thorough bass, according to the modern school. It appears strange that the fourth should be enumerated instead of the third. The Greek names specify the number of intervals by which the concords rise *dia tessaron,* through four intervals: *dia pason,* through all seven.

already remarked, the fourth and fifth, taken in order as high as the double octave, are naturally corresponding parts of the voice; and these concords are produced by the union of those sounds, which the Greeks call *pthongoi*[1].

[1] The reader who may be desirous of gaining information on the subject of the music of the antients, is referred to the *Entretiens sur la musique des Grecs;* introduced in the twenty-seventh chapter of the *Voyage du Jeune Anacharsis.*

## CHAP. V.

### OF THE VASES OF THE THEATRE.

From the foregoing investigations brazen vases have been made upon mathematical calculations, proportioned to the magnitude of the theatre. They are so constructed, that upon being struck they form amongst themselves concords of the fourth, fifth, regularly in succession, on to the double octave. They are then arranged amongst the seats of the theatre, according to a certain musical proportion, in cells made for their reception. They ought not to be placed in contact with the wall, but have a vacant space above and around them. They should be inverted, and the edge next the stage raised by means of wedges, six inches in height at the least: apertures ought to be made in the seats of the lower row, opposite to the cells, two feet in width and one in height.

The following rules ought to be attended to in arranging the vases. If the theatre be not very spacious, thirteen arched cells should be constructed equally distant, and in the same line, at half the height of the building. In the cells at the extremities of the auditory, the vases which sound the nete-hyperbolaeon should be placed: and next to them those which sound the fourth to the nete-diezeugmenon. In the cells, which are the third in order from the ends, those vases which give the fourth to the nete-parameson;

and next to them those which give the fourth to the nete-synemmenon. In the cells which are the fifth in order, those should be placed which give the fourth to the mese; and next to them those sounding the fourth to the hypate-meson. In the central cell a vase should be placed which sounds a fourth to the hypate-hypaton. By observing this order, the voice which diverges every where from the stage, as from a centre, striking each of these hollow vases, will acquire an increase of clearness and strength, and at the same time produce corresponding tones in concord with its own sounds.

But if the theatre be of large dimensions, there should be four divisions in the height; in order to admit of three ranges of cells across the theatre, for the enharmonic, chromatic and diatonic scales. In the lower ranges, the enharmonic vases should be arranged, in the manner already described for small theatres. In the middle range, the vases which sound the chromatic hyperbolaeon, should be placed in the cells at the extremities of the auditory; those which sound a fourth to the chromatic diezeugmenon, in the cells which are second in order from the ends. In the cells which are third in order, those which sound the chromatic synemmenon; in the fourth, those giving a fourth to the chromatic mese[1]; in the next, the vases sounding the fourth to the chromatic hypaton; and in the sixth, those sounding the fourth to the paramese, which is a common concord of a fifth to the

[1] The reading of Jocundus " ad chromaticen mese," is adopted in preference to " ad chromaticen synemmenon."

chromatic hyperbolaeon, and a fourth to the chromatic meson. The central cell should be without a vase; because in the chromatic scale there is no other sound capable of producing a perfect concord.

In the cells at the extremities of the upper range, vases which give the diatonic hyperbolaeon should be placed; in the next cells, those which sound a fourth to the diatonic diezeugmenon; in the cells which are third in order from the extremities, those which give a fourth to the diatonic synemmenon; next these, the vases sounding a fourth to the diatonic meson: in the cells which are fifth in order, those which give a fourth to the diatonic hypaton; and in the cells on each side the central one, those giving a fourth to the proslambanomenos. In the middle cell a vase should be placed which sounds the mese, as making common concords of fifths with the proslambanomenos diapason, and the diatonic hypaton.

If it should be required to bring these to perfection without great study, a reference may be made to the diagram at the end of this book; which is drawn according to musical proportion, and was discovered by Aristoxenus, with the aid of great acuteness and industry. It has descended to us with his divisions for the different scales. There will be no great difficulty, from the consideration of this diagram and the calculations here laid down, in constructing a perfect theatre; as far as relates to the nature of the voice and its pleasing effects upon the spectators.

It may perhaps be said that many theatres are built every year at Rome, in which no attention has been paid to these points: the objection however is not applicable, because it is not considered that all public theatres constructed with wood have many surfaces which act as sounding-boards. The truth of this will be manifest, if we observe those who sing to the harp; who, whenever they wish to sing in a higher tone, turn themselves to the leaves of the scene; from which they receive the assistance of corresponding sounds. But when theatres are not sonorous, in consequence of their being built with solid materials, such as stone or marble, whether wrought or unhewn, it then becomes necessary to have recourse to the expedient just explained.

If indeed it be asked in what theatre this plan has been pursued, I am unable to mention any in Rome; but there are examples where it has been adopted in Italy, and in many of the Grecian states; in proof of which it may be adduced, that Lucius Mummius, after destroying the theatre at Corinth, brought its brazen vases to Rome; and from the spoils dedicated a temple to Luna.

Many skilful architects who have built theatres in small towns have, in order to lessen the expence, adopted vases of pottery, instead of brass of the same pitch; and by arranging them according to these principles have produced the most useful effects.

# CHAP. VI.

## OF THE PLAN OF THE THEATRE.

The plan of the theatre is thus determined. A circle is described whose perimeter incloses the intended area of the orchestra; and four equidistant and equilateral triangles are inscribed in it, which touch the perimeter and divide it into twelve equal portions. The same method is practised by those versed in astrology, in dividing the zodiac into twelve constellations; from the belief that a musical concordance exists in the dispositions of the stars. The side of one of the triangles nearest to the situation which the scene is intended to occupy determines the line of its front; another line is drawn parallel to this through the centre of the circle, dividing the pulpitum of the proscenium from the orchestra. This method of determining the divisions renders the pulpitum of the Roman theatre more spacious than that of the Grecian; for with us all representations take place upon the stage, and the orchestra is appropriated to the accommodation of the senators. The height of the pulpitum ought not to exceed five feet, in order that what is passing on the scene may be distinctly seen by those in the orchestra.

The different ranges of seats allotted to the reception of the audience are separated by staircases: the positions of those which give access to the first praecinction are determined by the points made by the angles of the triangles at the circumference of the circle circumscribing the orchestra. The staircases which separate the middle and give access to the upper ranges of seats are determined by points which are intermediate between the seven staircases of the lower range. The remaining angles of the triangles determine the several divisions of the scene. One in the centre is opposite to the principal entrance. The hospitalia[1] are opposite the two on the right and left; and the remaining two face those approaches to the stage which are situated in the returns of the scene. The height of the steps of the auditory, upon which the benches are arranged, should not be less than a foot and a palm; nor more than a foot and six inches: their width not more than two feet and a half, nor less than two.

[1] The *hospitalia* of a Greek house were rooms in which strangers were received and entertained. The word hospitalium being used by Vitruvius, to designate a part of the scene on the right and left of the principal door-way, has given rise to an idea that there were rooms behind the scene of the theatre for the accommodation of strangers. We learn from Pollux, that the scene representing houses in which strangers were entertained was on the right of the centre scene; from which circumstance, it is probable, that that part of the permanent scene might have been called hospitalium.

# CHAP. VII.

## OF THE PORTICO AND OTHER PARTS OF THE THEATRE.

The uppermost range of seats has a portico constructed over it; the roof of which ought to range with the highest part of the scene; so that the voice, expanding uniformly, may be carried to the upper seats, and thence to the roof. For if the roof and the scene were of unequal heights, the sounds would be broken after passing the lower of the two altitudes.

Whatever be the diameter of the orchestra included within the lower range of seats, a sixth part of it should be assumed for the height of the approaches[1] to the stage in

[1] The height of the *itinera*, or entrances, which is determined by making it this portional part of the length of the orchestra, is thought by the commentators to be enormous; believing that Vitruvius, by the "itinera," intended to allude to the entrances into the orchestra. Galiani and Perrault, therefore, consider it necessary to alter the text from the *diameter* to the *semidiameter*, in opposition to the reading of all the manuscripts. I have however ventured to translate "aditus," as alluding to two of the approaches to the stage. These are mentioned by our author in the preceding chapter, in which they are called "itinera versurarum," or the approaches in the returns of the scene. The returns may be considered as forming part of the scene itself; because, from remains of the scenes of the ancient theatres, we may perceive that they were a continuation of the same design. Our author, in the passage immediately following, describes the various parts of the front of the scene, which are all proportioned by the scale of the orchestra; hence it would appear consistent that the approaches in the returns, or lateral continuations of the scene, should likewise be commensurate with the orchestra. The same reasoning will not apply to the entrances into the orchestra, of which there appear to have been several:

either extremity of the cavea. The lintels of these entrances should be placed at a height, above the lower seat, equal to this portion of the diameter of the orchestra. The length of the scene should be twice the diameter of the orchestra[1]. The height of the podium, with its coronae and lysis, a twelfth part of the diameter above the level of the pulpitum. Upon the podium columns are placed whose height, including the capital and base, ought to be the fourth part of the same diameter: the epistylia and other members of the entablature should be a fifth part of the height of the columns. The height of the pluteum above this entablature, with its coronae and cymatium, ought to be half that of the podium; and upon it a second range of columns is placed, which should be a fourth part less in height than those of the lower division of the scene: the entablature, like that of the lower range, should be a fifth part of the height of the columns it surmounts. If it be intended to have a third episcenium, its pluteum should be half the height of that belonging to the second division of the scene; and its columns a fourth part less than those of the intermediate range: their entablature, like those of the two lower divisions of the scene, a fifth part of their height.

The same proportions of the constituent parts cannot, with propriety, be observed in all theatres, whatever their

these may indeed with reason be supposed to be included amongst those parts which, as our author afterwards informs us, must necessarily be of the same dimensions in great as well as in small theatres.

[1] It is evident that Vitruvius intended to include the returns, or sides of the scene, in this proportional length.

magnitude: but it becomes necessary for an architect, in particular instances, to determine various proportions from which symmetry may result; and adopt such as may best accord with the nature of the situation; and at the same time be consistent with the magnitude of the building. There are parts in all theatres, whether large or otherwise, which are necessarily made to an invariable standard: such as the steps, the diazomata, the plutei[1], the passages, staircases, pulpita and tribunals, and other parts of a similar nature; which, were their proportions to depend upon the scale of the theatre, would prove inconvenient for general use.

When marble, timber, and other requisite materials are with difficulty procured, the judgment must be exercised to enable us to take away some parts and add others; the introduction of which is calculated to obviate an unnecessary expenditure of materials. To succeed in this requires not only great science, but likewise experience and fertility of invention on the part of the architect.

The sliding scenes[2] placed in the centre of the stage commonly represent a royal palace; those on the right and left, houses for the reception of strangers. Next to these are places which the Greeks call *periactoi*, because machines are stationed there which have revolving triangles; each

[1] The pluteum here mentioned seems to mean the podium surrounding the orchestra, from which the first tier of seats takes its rise. The tribunal was probably the thymele of Pollux, which, he says, was either a tribunal or an altar.

[2] The scenes which Vitruvius now proceeds to explain were the moveable scenes; although from the use of the term *valvae*, the translators imagine that he alludes to the doors of the architectural scene. See the explanation of Plate VI.

side of which has a different representation: these are turned whenever there is any change in the fable of the piece represented, or when the Gods are introduced with sudden bursts of thunder; and vary the character of the scene. Near these are the returns of the scene, affording two approaches to the stage; one of which is supposed to be from the forum, and the other from the country.

The three varieties of scenes[1] are termed tragic, comic, and satyric, each of which has a style of decoration peculiar to itself. In the tragic scene columns are represented with their fastigia and statues, and other embellishments, indicative of public buildings. The comic scene represents the houses of individuals, with their balconies and windows arranged after the manner of private dwellings. The satyric is made to resemble trees, caverns, mountains, and other objects characteristic of the country, and commonly constructed of topiary-work[2].

[1] In the printed editions, the eighth chapter begins here; but what follows seems so particularly connected with what has gone before, that a division of chapters appears to be improper. The Greek theatre, on the contrary, seems to have so little connection with the various kinds of scenes used by the Romans, that it requires to be noticed under a separate head. In the manuscripts the different books are not subdivided into chapters.

[2] The printed copies read "in topiarii operis speciem deformatis;" but the manuscripts, for *topiarii*, have *topeodi*. It is difficult to conjecture to what kind of work the latter word can allude. The opus topiarium was a kind of grotto-work, made with leaves and branches of trees; the use of it, therefore, would seem peculiarly adapted to the representation of rural scenes.

## CHAP. VIII.

### OF THE THEATRE OF THE GREEKS.

In the Greek theatre the mode of construction is, in some respects, dissimilar to that which obtains in the Roman; for instead of four equilateral triangles, which are inscribed in the circle of the orchestra of the Roman theatre, the Greeks made use of three squares, whose angles touch the periphery. That side of one of the squares which is nearest to the intended situation of the scene determines the extent of the proscenium: and a line drawn parallel to it through the point of curvature most distant from the auditory marks the front of the scene. A diameter of the circle is drawn parallel to the front of the proscenium intersecting the circle in two points: these are assumed as centres, from which arcs are described, extending from the extreme points of the diameter to the front of the proscenium. Thus the orchestra of the Greek theatre, described with three centres, is more spacious than that of the Roman; the scene more distant, and the pulpitum, which is termed *logeion,* is less in width. For with the Greeks dramatic performances alone are exhibited on the stage, and all other theatrical representations take place in the orchestra: whence it is that the actors in these different species of entertainment are severally termed scenici and thymelici [1].

The height of the logeum ought not to be less than ten nor more than twelve feet. The positions of the staircases which lead to the first praecinction between the cunei, are determined by the several angles of the squares. The number from the first to the second praecinction is increased by the introduction of others which are intermediate between those of the lower range. The same method is observed throughout the remaining praecinctions; so that every succeeding range of seats has a greater number of staircases than that which immediately precedes it.

These preliminary dispositions being determined with great care and circumspection, the next thing to be considered is, whether the nature of the place chosen for its situation be such as will admit of the voice being heard without much exertion: and whether there be nothing to cause a repercussion of the tones, from which a confusion of sounds might ensue. For there are places which naturally impede the propagation of sound; such are those which we term dissonantes, and the Greeks *catechountes;* or circumsonantes, which they term *periechountes;* and again, others which we call resonantes and consonantes, and they, *antechountes* and *sunechountes.* Those spots are called dissonantes, where the voice, in ascending, meets with interruption from some solid substance, by which it is reflected downwards, and made to obstruct the free ascent of succeeding sounds.

[1] See the explanation of Plate VI.

Circumsonantes are those in which the voice is compelled to be continually revolving; and the terminations are rendered indistinct by being blended with the sounds which follow in succession. Resonantes are those in which the sounds, striking upon some solid substance, are reflected, and an echo of the voice is produced, causing an apparent repetition of the last syllable of words. But those places are termed consonantes in which the voice, assisted from below, ascends with increased force, and reaches the spectators with distinctness. Thus the powers of the voice may be augmented if proper attention be bestowed upon the choice of a situation for the theatre. We shall be enabled, by attending to the instructions here given, to construct theatres upon the most approved principles; and, by instituting some variations in the plans, adapt them to the theatrical exhibitions either of the Grecians or Romans. In the first instance we must begin by inscribing three squares in the circle of the orchestra; and in the last by substituting four equilateral triangles for the three squares.

# CHAP. IX.

## OF THE PORTICOES AND WALKS BEHIND THE THEATRE.

Porticoes are generally built behind the scene of the theatre, that when a sudden fall of rain causes an interruption to the exhibition, the spectators may retire to them for shelter: they will likewise afford ample space for the rehearsal of the dances. Of this kind are the porticoes constructed about the theatre of Pompey; and the portico of Eumenes adjoining the theatre of Bacchus at Athens. To those who are quitting the theatre on the left hand the odeum presents itself. This building was erected by Pericles with stone columns, which he covered with masts and yards, the spoils of the Persian fleet. After its destruction in the Mithridatic war it was rebuilt by Ariobarzanes. The Stratoniceum at Smyrna, and the porticoes constructed on both sides of the stadium at Tralles, like the scene of a theatre, answer the same purpose.

In all cities where skilful architects have been employed there are porticoes and walks about the theatres. The first are generally double; the front consisting of Doric columns, with corresponding epistylia and entablatures. The distance measured between the columns of the exterior and interior ranges is equal to the height of the outer columns; the same distance is observed between the walls of the portico and the columns of the interior range; these are either Ionic or Corinthian, and a fifth part higher than the others.

The proportions of the columns employed in porticoes ought not to be similar to those which are used in the decoration of temples; because sacred edifices should be made to assume a character of solidity: but porticoes and other profane buildings should have an appearance of greater lightness. Hence, when edifices of this description are embellished with Doric columns, their height, including the capital, should be divided into fifteen parts, and one of them made the modulus; according to which every other part of the building is to be proportioned. The shafts at the base should be two moduli, and their intervals five moduli and an half: the height of the shaft should be fourteen moduli, leaving one modulus for the capital, whose abacus should be two moduli and a sixth part. The remaining parts of the portico should be proportioned to the lower diameter of the columns, according to the rules already given for sacred buildings.

If Ionic columns are used, their height, exclusive of the base and capital, should be divided into eight parts and an half, and one part given to the diameter of the shaft at the base. The bases should be half the diameter; and the capitals formed according to the principles already explained.

If the columns are intended to be of the Corinthian order, the shaft and base should be similar to those of Ionic columns, and the capitals formed according to the method related in the preceding section. The addition which is given to the stylobate when unequal scamilli are used, is here to be introduced in the same manner as in the porticoes of temples. The epistylia, coronae and every other part, should be proportioned to the diameter of the columns, according to the rules given in the foregoing sections.

The open area, surrounded by the porticoes, should be planted; and hypaethral walks, which are so essential to health, formed between the trees. They are beneficial to the eyes in an eminent degree, because where there are green trees the air is attenuated and subtilized by their motion, and therefore, penetrating readily, clears the sight: moreover by purging the gross humours of the eye, it sharpens the organ itself, and renders the images distinct. And when exercise has produced a gentle perspiration, the air draws forth the humours from the body, and dissipating what is superfluous, renders them more easy of circulation through the vessels, and leaves the temperament of the body less inclined to be plethoric. This will be readily comprehended by attending to the appearance about places where springs of water are under cover, or where the earth abounds with subterraneous damps; for no vapours are there found to arise: but in situations exposed to the air, when the action of the sun's rays becomes sensible upon the earth, vapours arise from the humid spots, which are condensed, and ultimately ascend. Hence, if it appear that the noxious humours of the body are dissipated by the action of the air, in the same manner that vapours are attracted by the action of the sun upon the earth, in places exposed to the air, no doubt can exist that hypaethral walks in all cities, sufficiently spacious and properly planted, may be made conducive to the health of the inhabitants.

In order to render the walks firm and free from damps, the earth must first be dug out to a proper depth, and drains of brick-work constructed on each side, and channels left in the walls with a gentle inclination from the walks into the drains. The whole space may be then filled in with charred wood, and the surface covered with sand, which, when levelled, forms the walks. Whatever water falls, will either be carried by the channels into the drains, or will filtrate through the charcoal, leaving the surface of the walks firm and free from moisture.

Our ancestors appear to have availed themselves of the resources which works of this kind presented in cases of public emergency. In sieges every requisite of subsistence is more easily obtained than fuel. Salted provisions may be procured without much previous notice, and corn easily collected by the community and individuals: when these fail, oil, flesh and vegetables may be substituted for them. Water may be obtained by sinking wells, or collecting the rain from the roofs of houses, as it falls from time to time. But to collect a sufficiency of fuel, which is essentially necessary in the preparation of food, requires both time and assiduity; because those stores which have been long collecting are quickly consumed. In extremities like these, the public walks are still a resource; and the wood may be distributed equally amongst the inhabitants. Hypaethral walks therefore, above all other national works, possess two important advantages; inasmuch as they afford the means of health to the inhabitants in days of peace, and in times of war they may be made to contribute to the exigences of the state. For these reasons it may be expedient to make walks, not only behind the scene of the theatre, but also around all sacred edifices.

Having dwelt sufficiently upon this subject, we shall proceed to explain every thing which is necessary to be observed in the construction of baths.

## CHAP. X.

### OF THE PARTS OF THE BATH AND THEIR SEVERAL USES.

The situation chosen for baths ought to be sheltered from the north and north-east. The caldaria and tepidaria should be made to receive their light from the winter-west: or, should local circumstances not admit of this disposition, they may both be made to face the south; because the general time of bathing is from mid-day until sun-set. One thing necessary to be observed is, that the caldaria of that division of the bath which is appropriated to the women should be contiguous to that exclusively used by the men, and have the same aspect; for then the coppers of both may be heated from the same furnace.

Three brazen vessels are fixed over the furnace, which are severally called caldarium, tepidarium, and frigidarium: they are so arranged, that whatever heated water is taken from the first, is replaced by warm water from the second; the deficiency of which is supplied, in a similar manner, from the third. The concave coverings of the small tubes [1] of both baths are likewise heated from the same furnace.

The insulated stages of the caldaria are thus constructed. The floor is made inclining towards the furnace; so that if a ball were placed upon any part of it, it would not remain

[1] In the manuscripts, these tubes are called *alveoli*. The printed editions read *alveorum* for *alveolorum*, and thereby confound them with the *alveus*, or passage, around the bath, between the wall and pluteum.

at rest, but take a direction towards the mouth: by which means the flame will more easily pervade the interval between the floor, which is paved with tiles a foot and half square, and the suspended stage. Upon the floor earthen props, eight inches each way, are arranged at such intervals as to receive upon them square tiles two feet in length: the props are two feet in height; the tiles which form them are cemented with clay and hair mixed together: the square tiles which they support form the substratum of the pavement of the caldaria.

It is desirable that the roofs of the caldaria should be constructed with masonry; but when formed of timber, the ceilings must have a covering of tiles; which may be thus effected. Rings or cramps of metal are made and fixed to beams of the ceiling at equal intervals, and so far asunder, that tiles, without margins, may rest upon two: in this manner the entire ceiling, supported by iron-work, is completed. The joints of the tiles above should be covered with clay mixed with hair; and the lower surface of the ceiling first coated with a composition of lime and pounded tiles, and afterwards made smooth with stucco. The work will be more perfect if the ceilings of the caldaria are made double: for then whatever vapour escapes through the first will never penetrate to the wood-work, and thereby occasion its decay; but will be condensed and carried off in the void interval between the two ceilings.

The magnitude of the bath must be proportioned to the population of the place: but in all instances its dimensions should be such that the width, exclusive of the schola of the bath and the passages around, may be a third part less than the length. The bath should receive its light from the upper part of the apartment on every side; so that persons who are standing around may not intercept the light from those who are using the bath.

The schola of the labrum should be sufficiently spacious to accommodate those who are obliged to wait until the bath is unoccupied. The alvei between the walls and the pluteum ought not to be less than six feet, of which space the lower step and the bench occupy each two.

The laconicum and sudatories should be contiguous to the tepidarium: the height of the latter from the floor to the line whence the hemispherical roof springs, should be equal to their width. The air is admitted through an aperture in the centre of the roof, from whence a brazen shield is suspended by chains.

The temperature of the sudatory is regulated by elevating or lowering the shield. The plan of the laconicum [1] should be circular, in order that the flame and heat within it may be equally diffused over its concave surface.

[1] Vitruvius here alludes to the plan of the laconicum, and not to the shield and the aperture through which the air is admitted. The painting found in the baths of Titus exhibit a laconicum of a circular form within the *sudatio concamerata.* According to this the laconicum forms a part of the sweating bath, and seems there intended for the purpose of warming it. By attending to the construction of the passage, the meaning of Vitruvius may be rendered sufficiently clear. "Laconicum sudationesque sint conjungendae tepidario. *Eaeque* quam latae fuerint, tantam altitudinem habeant ad imam curvaturam hemisphaerii, mediumque lumen in hemisphaerio relinquatur, ex eoque clypeum aeneum catenis pendeat, per cujus reductiones et demissiones perficietur sudationis temperatura; *ipsumque* ad circinnum fieri oportere videtur . . . ."

## CHAP. XI.

### OF THE CONSTRUCTION OF PALAESTRAE.

The nature of our treatise seems to require that some account should be given of palaestrae, and the method of constructing them, prevalent amongst the Greeks; although they are not in use in the states of Italy.

In palaestrae there are peristyles which are two stadia in circuit; from which space is derived the Greek term *diaulos:* they are built sometimes in a square form, and sometimes longer than they are wide. Three of these are single porticoes, but the fourth, which is made to face the south, is a double portico; so that the rain is never driven by the wind into the interior ambulatory.

Within the three porticoes there are spacious exhedrae, containing seats for the accommodation of philosophers, rhetoricians, and other professors of literature, who are accustomed to meet and converse there.

Various apartments are within the double portico: in the centre is the ephebeum, which is an extensive exhedra, a third part greater in length than in width, surrounded with seats. On the right is the coriceum, and next that the conisterium: beyond the conisterium, in the return of the portico, is the cold water bath, which the Greeks term *loutron.* On the left of the ephebeum is the elaeothesium; and next that the frigidarium; beyond which, in the return of the portico, is the passage to the propnigeum. Within this the sudatory is placed, opposite the frigidarium, in length equal to twice its width; and has on one side the laconicum, constructed in the manner already described; and opposite the laconicum the heated water bath. This is the disposition, generally adopted, of the parts of a palaestra within the peristyles [1].

Without the building there are three porticoes, one opposite to the entrance into the peristyle, and two on the right and left, which are formed like stadia. That which

[1] The construction of this and the following passage is worthy of consideration, before we attempt to illustrate the description of Vitruvius by a reference to the supposed ichnography of the palaestra. In all the plans hitherto given, the peristyle is represented, like that of Greek houses, surrounded by the buildings constituting the palaestra; but in the gymnasium at Ephesus, of which considerable vestiges remain, it is evident that the peristyles were without; and the apartments enumerated by our author occupied that space which, in the supposed plans, is represented as an open court. In a scientific treatise written in a language no longer in use, we must expect to meet with some terms whose signification can only be explained by internal evidence. This is not the only difficulty which presents itself to a translator of the work of Vitruvius; because his style is far from perspicuous. Nor is it to be wondered at that those who know the palaestra chiefly through the description of Vitruvius, should fail in the attempt to represent it as it really was. It is incumbent on those who have been enabled to restore the plan of the Greek gymnasium from the actual existence of parts of it, to shew how his description may be made to accord with it. The plan of the gymnasium, or palaestra, is given at the end of the section. It varies altogether from those which have hitherto been given in illustration of the text; but the variation is founded upon the position of the porticoes, which, in these, are shewn surrounded by the buildings, and not surrounding them. The passage which concludes the description of the buildings forming the palaestra is as follows:—" In palaestra peristylia, quemadmodum supra scriptum est, ita debent esse perfecte distributa," the obvious meaning of which seems to be, " The peristyles of the palaestra, to be well arranged, must be disposed in the manner above mentioned." The commentators seem to have been of opinion that the words beginning the passage, necessarily determined the position of the peristyles.

faces the north is double, and of ample width. The others are single, and have margins, like foot-ways, ten feet in breadth, next the walls and the columns: the intermediate space between the margins is excavated and levelled, and a descent is made to it from the margins by two steps a foot and a half each: the area alone is not less than twelve feet wide. On this account those who are taking exercise in the margins meet with no interruption from those engaged in gymnastic sports within the area. A portico of this kind is called by the Greeks *xystos*, because the athletae practise during the winter in stadia protected from the weather. The xysta are placed so far apart, that the intermediate space between the porticoes may admit of plantations and walks amongst the trees, with seats here and there formed of cement. Next the xysta and the double portico, hypaethral walks are made, which the Greeks call *peridromides*, although with us these are termed xysta. In temperate weather during the winter the athletae leave the xysta and exercise in these walks. Behind the xystum is the stadium, so formed as to contain, without inconvenience, the multitude who resort there to witness the athletic exercises. This concludes the description of every public building which is required to be situated within the boundary of the city.

# CHAP. XII.

## OF PORTS AND BUILDINGS CONSTRUCTED IN WATER.

The opportunity which presents itself of giving some account of ports, and by what means protection may be afforded to ships from the elements, ought not to be neglected. The positions best adapted by nature to such a purpose are bays, with capes and promontories at their extremities; from which the shore recedes inwardly in a curved line. Upon shores of this description docks may be built or porticoes erected; or a channel cut from the port to the emporium, defended by towers on each side; in which machines may be constructed for throwing booms across the passage.

If however no situation can be found capable by its formation of protecting vessels against the violence of the sea, we must search for a spot where a promontory presents itself on one side, and where no river discharges itself so as to oppose its application to the purposes of a harbour; and supply the want of a corresponding projection on the other by building walls and buttresses. The walls, which it becomes necessary in this case to construct in the water, may be thus formed. Sand should first be procured from that part of the coast lying between Cumæ and the promontory of Minerva, and mixed with lime in the proportion of two parts to one: then rows of grooved beams must be driven in the water, connected by oaken planks; and bound together by chains. The surface of the ground below the water, on which the wall is to be reared, must then be made even by means of transtilli, and the space comprehended between the beams filled with a composition consisting of rough stone and cement, made in the manner just described. Such is the quality of the sand produced in these spots that the composition becomes a solid wall.

But if the beams cannot be firmly fixed on account of the tides, or from being exposed to the swell of the open sea, a strong buttress must be built upon the border of the water. A portion somewhat less than half the upper surface of the buttress should be constructed upon an horizontal level; and the remaining part inclining towards the sea. Upon the edges of this part of the buttress, walls, a foot and a half in thickness, should be raised to the height of the level part, and the intermediate space filled with sand. Upon this foundation a solid pile may be built; and after being finished may be left to dry for two months at least. The walls which were raised upon the edges of the inclined surface of the buttress, and which confine the sand, should then be destroyed; and the water washing away the sand by degrees will undermine the pile, and cause it to be precipitated into the sea. This operation should be repeated until the whole is completed.

In places where this sand is not to be procured we must resort to other methods. The space which the mole is intended to occupy should be inclosed by a double range of beams, connected together by planks and chains; the interval between the two ranges should then be filled with loam rammed into baskets made of the ulva palustris: when the space is filled by masses of this kind, stowed as close together as possible, the water contained in the enclosed area may be removed by cochleae, rotae, and tympana. When the ground is left perfectly dry, the foundations may be dug of greater width than the walls they are intended to support; and filled in with rough stone, lime, and sand. Piles of charred alder, olive, or oak, must first be driven in the ground if it be soft, and the intervals between them filled with charred wood in the manner already described for forming the foundations of the walls of theatres. The walls should be built upon these foundations with squared blocks of considerable length; so that the stones between these blocks, which extend across the wall, may be bound firmly together. The space inclosed by the walls may be filled in with rubble or stone-work; and be made so firm that a tower may be erected upon it.

The mole being completed, the docks should be built facing the north; because the greater heat of a southern aspect occasions a more rapid decay; and engenders and nourishes moths, ship worms and other noxious insects. Timber should be used as sparingly as possible in works of this kind, that they may not be liable to accidents by fire. No certain rules can be given for the size of the docks, but they should be capable of containing ships of the greatest burden; so that if at any future period it should be necessary to receive vessels of a larger size there may be ample room for them.

In this book I have treated of all the public buildings which appear to me necessary in every city; in the succeeding section I propose to discuss the proportions and applications of the several parts of private edifices.

# EXPLANATION OF THE PLATES

TO

# SECTION III.

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TO

## SECTION III.

VITRUVIUS treats in the fifth book of the public buildings of the Romans, such as the fora, theatres, baths and palaestrae. There were two fora at Rome before the time of Augustus, who added a third. Succeeding emperors increased the number; amongst which that of Trajan was the most celebrated. The forum was an area of considerable magnitude, generally of a quadrangular form, inclosed with porticoes two ranges in height. The lower of these was occupied by the shops of the bankers, and the other was appropriated to the reception of the public, who resorted there to view the exhibitions; particularly the shew of gladiators, which were exhibited in the forum before amphitheatres were in general use.

The forum of Trajan, some remains of which are still existing, appears to have been of a semicircular form at the ends. In fact, all those of a date posterior to the time of Augustus, like that of Nerva and this of Trajan, differed in their ichnography from that of the forum described by Vitruvius. The reason for departing from the original form might probably be the discontinuance of the gladiatorial exhibitions, after the construction of amphitheatres had become general.

## PLATE I.

### PLAN OF THE BASILICA BUILT BY VITRUVIUS AT FANUM.

The basilicae were spacious halls, built for the administration of justice, and for merchants to assemble in during the winter. They were surrounded within by porticoes two ranges in height; in the upper of which persons might walk unseen by those below.

A basilica, the plan of which is represented in this plate, is described by Vitruvius to have been built by him at Fanum: the mode of its construction was different from that generally followed in structures of the same kind. The buildings connected with the basilica, excepting the pronaos of the temple in one of its sides, are added from conjecture, founded upon the remains of the forum of Trajan; on one side of which the basilica was built, with the chalcidica and entrances at the ends.

On the side of the basilica opposite the forum was the pronaos of the temple of Augustus, containing the tribunal, or elevated stage, upon which the magistrates used to sit and determine causes. The front of the tribunal was made receding, in a curved line, from the porticoes of the basilica, so that the affairs of the magistracy might not interfere with the business of the merchants.

The middle area of the basilica was 120 feet long and 60 wide: whence it follows, that the intervals between the columns of the sides and the ends were unequal. The distance between the antae of the pronaos could not have been quite 49 feet, whereas the width of the pronaos itself must have been 60 feet, in order that the culmen, or ridge of the roof, might unite with that of the basilica, in the manner described by Vitruvius. Hence the antae could not have terminated the lateral walls of the temple, but must have projected on each side into the pronaos; in conformity with the description, which states that they extended forward so as to be in contact with the extremities of the circular front of the tribunal. The chord of the front is said to have been 46 feet, which would have been, within less than an inch, the extent measured between the bases of the antae.

a......The middle area.
bb....Porticoes.
cc.....Chalcidica.
d......Cella of the temple of Augustus.
e.......Tribunal in the pronaos.
f......Part of the forum.
g.....Lower porticoes of the forum.
hh...Offices of the bankers.
ii.....Staircases leading to the upper porticoes.

## PLATE II.

### SECTION OF THE BASILICA AT FANUM.

In order to reduce the expences of building, the interior entablature of the basilica appears to have been constructed with timber, and covered with stucco. The epistylium was first formed of three pieces of timber, two feet square, placed one above the other; making that division of the entablature six feet in height: which is nearly the proportion it ought to bear according to the principles given in the third chapter of the first section. For by extending the scale we shall have a tenth part of the height of the columns for the epistylium of such as are from forty to fifty feet; which, added to a seventh part for the cymatium, would amount to nearly five feet nine inches. This proportion will not appear to have been too great, when it is considered that the greatest distance at which the columns might be seen by a spectator within, could not have been 150 feet; consequently the epistylium must have appeared much foreshortened. It has been thought by some that our author's expressions do not convey the idea that the three beams were placed one above the other: but then a difficulty arises as to the method in which this uneven number could have been otherwise arranged.

It seems more consistent with reason to suppose that the entablature was formed of stone on the outside; for although the intervals between the columns at the ends were more than three times the diameter, and consequently the species araeostyle, which seems to imply a necessity for constructing the epistylia with timber, yet those of the flanks were little more than two diameters and a half; and therefore within the limits of the diastyle species; in which the epistylia were constructed with stone or marble.

Pilae were placed immediately over the columns above the epistylium; they were blocks of stone three feet in height and four feet in width each way. These determined the height of the zophorus. The intermediate spaces were probably closed with masonry without, and the opus intestinum within. The corona was formed in the same manner as the epistylium, but with two beams only two feet high each; which supported the timbers of the roof.

## PLATE III.

### PLAN OF THE THEATRE OF MARCELLUS.

Although general opinion favours the supposition that Vitruvius wrote during the reign of Augustus, some have contended that the fact is by no means established. It is asserted on the contrary, that many passages in his work authorize an inference that his proems were addressed to some subsequent emperor.

Without attempting to refute the arguments adduced in support of this opinion, we shall content ourselves with mentioning one circumstance; which is of sufficient weight to induce us to receive with caution any hypothesis in opposition to the prevailing belief, which considers Augustus and Vitruvius to have been contemporaries.

This circumstance, which carries with it the conclusion that his work was composed in the early part of that emperor's reign, is the absence of any mention of the theatre of Marcellus. Besides, the general mode of construction which he recommends, differs materially from that which was followed in erecting this magnificent monument of Roman splendour. In this as well as in every other building of a later date, constructed for the exhibition of dramatic performances or public games, the external arcades, tier upon tier, constitute a principal feature of the edifice; and consequently seem to require a much more ample description than the scene, which was simply a facade resembling the front of the forum: yet this is described by our author at some length. These arcades, from their connexion with the vomitoria, would have afforded a more immediate shelter from the sudden fall of rain; and superseded the use of porticoes behind the scene, which were constructed principally for that purpose previously to the period in which Vitruvius wrote. If it be asked to what purpose the space below the several ranges of seats, which in the theatre of Marcellus is occupied by corridors and staircases, was appropriated in theatres built prior to the reign of Augustus? it may be replied, that the early theatres of the Romans, like those of the Greeks, their acknowledged prototypes, were situated in the side of a hill, upon the ascent of which the seats of the audience part were built. In directing the choice of a spot for the theatre, Vitruvius says, that such a situation is to be preferred; because in this case the labour in constructing foundations will be comparatively small. But if at any time circumstances should require a theatre to be built upon level ground, the want of natural ascent must be supplied by solid substructures. This is the only passage alluding to a mode of construction different to that which had its origin amongst the Greeks.

Various plans of the theatre of Marcellus have been given by different authors. Serlio pretends to have obtained one, which is published in his work, from Baldessare an architect of Sienna; who was employed in erecting the buildings which now occupy a great portion of the site of the theatre. The plan given by Degodetz was procured by him during his residence at Rome; it does not vary materially from that of Serlio. The plan, however, which carries with it internal evidence of being the most correct, was published by Piranesi in the fourth volume of the *Antichita Romane.* The ichnography and sections of the parts which then remained, are given without any attempt to restore them: there is, however, sufficient to authorize the restoration of the whole of the audience part.

The ground plan of the theatre is represented as restored in Plate 3. The positions of the staircases between the cunei, were determined from an attentive consideration of the plates of Piranesi. It ought here to be observed, that the openings in the circular walls at the top of the staircases, b.b, ought to have been closed, had we attended strictly to the representation of the ground plan; since, in fact, they are ten feet above the level of the entrances into the orchestra: the openings are here left in order to shew more clearly the communication with the staircases between the converging walls.

The restoration of the scene and the parts adjoining, were effected chiefly from a fragment of the old plan of Rome existing in the capitol: the front of the scene being previously determined, according to the method given by Vitruvius, by inscribing four equilateral triangles in the circle embracing the area of the orchestra. The extent of the front was ascertained by a pilaster and an engaged column, which were in part existing at s. From these vestiges, it appears that the front of the scene must have been 386 Roman palms in length; and the two returns of the scene, provided the line of the front had been determined by the base of the first triangle, would together have been equal to the radius of the orchestra, which was 124 Roman palms. Hence the length of the scene, including the returns, would have been 510 palms. Vitruvius directs the length of the scene to be made twice the diameter of the orchestra; which measure this extent exceeds by 14 palms.

At the time that the plans of Piranesi were taken, there were considerable remains of the uppermost seats in the second range of cunei; the highest of which was nearly level with the cornice of the second external order of columns: whence it is evident that this, like every other Roman theatre of a date subsequent to the age of Augustus, must have been built with more than two external ranges of columns and arches.

The other plans which have been mentioned represent the orchestra and proscenium preposterously large compared with the body of the theatre. There is another plan given in a work entitled *Gli Edifici antichi di Roma,* published by Piroli, the general dimensions of which agree very nearly with those given by Piranesi.

The positions of the staircases separating the cunei of the first cavea of a Roman theatre, were determined by seven angles of the triangles inscribed in the circle bounding the orchestra: the positions of those in the second cavea, were intermediate between every two in the first. The staircases of the theatre of Marcellus appear to have had a disposition nearly similar, although not correctly so. The five remaining angles determined the position of the several parts of the scene: the middle one was opposite the doors called regiae; those on the right and left of that were over against the hospitalia; and the remaining two faced the entrances which were situated in the two returns of the scene.

a.a.. Passages to the orchestra.
b.b. Staircases to the first cavea.
c.c.. Staircases to the second cavea.
d.d. Staircases to the third cavea.
e.... Orchestra.
f..... Pulpitum.
g.g. Front of the scene.
h.... One of the scenes termed periacti.
i..... Doors called regiae.
k..... One of the door-ways termed hospitalia.
l... One of the itinera versurarum.
m.. The first praecinction.
n... Second praecinction.
o... Third praecinction.
p... Portico.
q.. Plan of half the roof of the scene.
r.r. Walls against the horns of the cunei.
s.... A column and pilaster belonging to the return of the scene.

# PLATE IV.

## PLAN OF THE THEATRE AT POLA.

The plan of the theatre of Marcellus, as it is given by Piranesi, being incomplete from the want of the scene, the plan of a theatre at Pola, which has the scene as well as the porticoes behind it in part remaining, is here introduced from the plates of Serlio. It corresponds in many particulars with the description Vitruvius gives of the Roman theatre, such as the position of the scene, and the arrangement of the interior.

Four equilateral triangles are inscribed in the area formed by completing the circle of the orchestra. a.a. Are those angles which determine the position of the staircases between the lower cunei. d.d. The base of the first trigon, which is in a line with the front of the scene. b. The valvae regiae. c.c. The door-ways, called hospitalia. The line à.à. which passes through the centre of the circle divides the orchestra, A from the proscenium, B. e.e. The entrances in the returns of the scene. f.f. The revolving scenes termed periacti. g.g. The lower range of seats divided into cunei by staircases leading to the first praecinction, h.

The seats of the senators were arranged in the orchestra, which, like that of the Greek theatre, was at first a level area; but in after-times a gentle ascent was given to it. The benches of the orchestra were termed sedes by Vitruvius in contradistinction to those of the cunei, which he calls subsellia: they were placed at equal distances asunder, and not fixed.

## PLATE V.

### SECTION THROUGH THE CAVEA OF A ROMAN THEATRE.

Although the plans of the theatre at Pola, which are given by Serlio, do not afford sufficient authority for a restoration so complete as is here represented, the general plan of that theatre is sufficient to form the ground-work of a section. The passages and staircases are taken in part from Serlio, and in part from the section given by Piranesi of the theatre of Marcellus. The return of the scene is added from conjecture, aided by the remains of the scene of a theatre at Patara on the coast of Lycia in Asia-minor.

## PLATE VI.

### PLAN OF THE THEATRE AT TAUROMENIUM.

The disposition of the parts of a Greek theatre did not vary materially from that of the Roman; but as recitations alone took place upon the stage, which in the Roman theatre was common to both actors and dansers, that division was not necessarily so large in proportion to the entire theatre. The circle which incloses the area of the orchestra, if it were completed, would touch the front of the scene; and if three squares be inscribed in it, that side of one of them which is parallel and nearest to the front of the scene, determines the extent of the proscenium. The form of the orchestra was not alike in all theatres: sometimes it was a semicircle prolonged by lines drawn from its extreme points; like that of the theatre at Tauromenium. Sometimes it was a greater segment of a circle than a semicircle; as in the theatre of Herodes Atticus at Athens, and in the theatres of Asia-minor. According to Vitruvius, the orchestra was formed by arcs of different circles, thus; a diameter of the circle was drawn parallel to the front of the scene, and the points where it cut the circumference, were assumed as centres from which arcs were described, with a radius equal to the diameter, whose lengths were terminated by the line of the proscenium.

The proscenium and the pulpitum, or λογεῖον, have been thought by some writers to have had the same signification: the text, however, of Vitruvius notices them as distinct parts; and the words, " pulpitum proscenii," shew that the one was an appendage to the other. Pollux mentions the proscenium amongst the permanent parts of the theatre; and it was probably the solid stage constructed in front of the scene, like that which still exists in the theatre at Tauromenium. It is there considerably above the level of the orchestra; and if a square were inscribed in the circle of the orchestra, the side next the scene would be very nearly in contact with the front of the proscenium, in conformity with the description of Vitruvius. The pulpitum was therefore, in all probability, a wooden stage, affording a temporary extension of the proscenium when dramatic performances were recited; and was removed when dances and other exhibitions took place in the orchestra; or when the theatre was used for other public purposes. In the permanent stage there is no indication of apertures for the entrance of ghosts and the furies, which were sometimes introduced in the Grecian drama; and, according to Pollux, were made to ascend from below the stage by staircases, which were termed charonian, situated next the orchestra; the apertures were probably made in the pulpitum. Had the action been confined to the proscenium, a view of what was passing would have been denied to a considerable portion of the audience. Indeed it is evident that there must have been a temporary stage over the proscenium of the theatre, whose plan is represented in the plate under consideration; for otherwise the entrances to the stage a.a. in the returns of the scene, could not have communicated with the scene: yet those who were supposed to be entering from the forum or the port, approached the scene through these door-ways. In order to give more space to the orchestra on public occasions, or when dances were performed, the pulpitum might have been removed; and the action of the mimi extending itself over the whole area of the orchestra, the greater part of it would have been within view of all the spectators, whatever their situation in the theatre.

Pollux, from whom we gain our knowledge of various particulars relating to the stage, wrote during the reign of Commodus; that is, about two hundred years subsequent to the age in which Vitruvius is supposed to have lived. His descriptions, notwithstanding, apply to the Greek theatre and not to the Roman; for his appropriation of the proscenium and the orchestra is similar to that which, Vitruvius informs us, obtained in the former.

Our author observes that, amongst the Greeks, the persons employed in theatrical representations were divided into two classes: they were termed either thymelici or scenici, according to their several occupations. The first performed in the orchestra; and the latter, in which were comprehended the tragic and comic actors, exhibited in front of the scene. It is not possible to ascertain whether or not by the thymelici, Vitruvius meant those only who formed the chorus in tragedy or comedy; or whether, in this class, he intended it to be understood that the dansers, properly so called, and inferior performers were included. The words of Pollux, which appropriate the stage to the actors, and the orchestra to the chorus, seem to favour the former supposition.

The nature of the thymele, which gave to one class the denomination of thymelici, cannot be defined by any authority deduced from ancient writers. M. Boindin, who has written a treatise upon the subject of the ancient theatres, printed in the first volume of the *Histoire de l'Academie Royale des Inscriptions,* imagines the thymele to have been a stage in front of the proscenium, upon which the chorus exhibited; and that the orchestra was appropriated to the dansers and those employed in mimic representations. In support of such an opinion it may be urged, that the evolutions of the few who composed the chorus of the ancient drama, could not have required a space so extensive as the orchestra of the Grecian theatre. It may be remarked likewise that, by admitting the existence of a stage in front of the scene, virtually increasing the extent of the proscenium, we should identify the ancient thymele with the Roman pulpitum.

On the other hand it ought to be observed, that the words βῆμα and βωμὸς, which Pollux uses to describe the nature of the thymele, seem to indicate that it was of no great magnitude. He proceeds to state that it was anciently the custom to place an altar in front of the scene, upon which the coryphaeus was stationed to direct the movements of the chorus: from which it might be inferred that the thymele was nothing more than the altar of an earlier age.

A part of the theatre mentioned by Pollux is altogether unnoticed by Vitruvius; that is the hyposcenium; which appears from his account to have been the ornamented front of the proscenium facing the orchestra; and probably was not seen but during the exhibitions of the orchestra, when the pulpitum and all the occasional scenery were removed. He states it to be below the pulpitum, and adorned with pedestals and small statues. The proscenium of the Greek theatre appears from Vitruvius to have been from ten to twelve feet above the level of the orchestra. It would therefore be necessary to give to the front of it some character in order to unite it with the scene itself, at those times when the latter was exposed to the view of the audience. This might be effected in the manner described by Pollux. It is necessary to observe that the literal meaning of the words employed to express the ornaments composing the front of the hyposcenium is, columns and small statues: the height therefore assigned to the proscenium would not seem to admit of decorations of this kind, unless we may be allowed to give a meaning less general to κίων, when we find it coupled with the diminutive ἀγαλματίον.

According to M. Boindin, the hyposcenium was a considerable space before the proscenium, within the limits of the orchestra. He supposes it to have been occupied by those who played upon musical instruments and accompanied the chorus in tragedy, and the mimi in their dances. It does not appear however that the chorus, in the performance of the Greek drama, was ever accompanied by more than a single instrument; and those who were engaged in the exhibitions of the orchestra generally accompanied their action either with playing or singing. In either case there is no reason for supposing that a number of musicians were employed.

In speaking of the disposition of the scenes, in the seventh chapter of this section, Vitruvius is thought by his commentators to have alluded to the parts of the architectural scene: and that, by using the word *valvae,* he intended it should be understood, he was speaking of the doors of the scene. It is obvious, however, that he is there treating of the moveable scenes. They might probably be termed *valvae,* from being, like folding doors, in two parts or leaves, which, instead of moving upon hinges, were made to run in a groove and connect with the scene in the centre. Scenes of this kind were termed *ductiles,* in contradistinction to revolving scenes, which were called *versatiles*. The θύραι of Pollux were the same thing. This author, in treating of the parts of the theatre, says that the θύρα ἀριστερὰ, or the scene on the left hand, sometimes represented a house of mean appearance; at other times a ruined temple; and sometimes was without any device of this kind, according to the subject of the piece represented. It would be absurd to suppose that the changes of the scene were effected by different paintings upon the doors of the permanent scene.

We now come to the consideration of a practice mentioned by our author, upon the subject of which no research has hitherto thrown any light. This was the disposing of brazen vases below the seats of the spectators in order to assist the powers of the voice. It is a matter of doubt whether the practice to which he alludes was ever resorted to; and whether the mention he makes of it might not have been prompted by the desire of reducing all practice under the guidance of physical principles which, as we have before observed, manifests itself in various parts of his work. The idea might have been suggested by an observation of Aristotle[1] upon the efficacy of hollow vessels in causing the vibration of sounds, and extending their effects, when covered and buried.

There is a passage in Pliny which alludes to a mode of building peculiar to the walls of theatres: for in constructing the walls of other edifices, the interior space between the two faces of the wall was filled in with rubble; whereas in theatres, hollow vessels of earthenware were immured: and

[1] Prob. 8 and 9, Sect. II.

whenever it was required to prolong the vibrations, or to increase the powers of the voice, the orchestra was strewn with sand or saw-dust; by which means the voice being directed to the body of the house, the sounds were carried along the walls so long as there was no impediment to obstruct their course. Pliny in describing this mode of building, might have had our author in view; whose mention of vases received a degree of confirmation from the fact that earthen vessels were sometimes inserted in the masonry of ancient buildings. An instance in which this practice has been adopted, occurs in the circus of Caracalla. Vases are found regularly distributed in the stone-work above the crown of the arches which were constructed for the purpose of giving a proper degree of elevation to the seats of the spectators. The object of their introduction seems to have been the diminution of weight. Vitruvius confesses that there was no theatre at Rome which had vases for such a purpose; although he states them to have been in use in the provinces of Italy, and in most of the cities of Greece. It is certain, however, that in the various theatres which have fallen within our observation, no provision has been made for the reception of vases in the situation which Vitruvius assigns to them.

Lucius Mummius is said by some authors to have brought away brazen vases from the theatre of Corinth. This fact is adduced by Vitruvius in corroboration of the application of his principle to practice. But the purpose to which these vessels were previously applied is not mentioned. Strabo gives an account of some Corinthian vases which were found when the city was rebuilt by Caesar, who sent thither a colony for that purpose. In clearing away the ruins some old sepulchres were opened, and a great many vases discovered; some of which were brass, but the greater number earthen-ware. The workmanship of these was so exquisite, that they were held in the highest estimation at Rome, and sold for great sums. The vases brought away by Mummius were probably of this description; because, to have been an object worthy of deportation amongst the rich spoils of that city, they must have been valuable either on account of their workmanship, or the worth of the metal; neither of which could have been the case with the vases used for the purposes mentioned by Vitruvius. It must be remembered that the reputed Corinthian brass is supposed to have been a mixture of metals which were run together during the conflagration of the city; and was carried to Rome in that state, and there manufactured into vases.

## PLATE VII.

### PLAN OF THE THEATRE OF HERODES ATTICUS AT ATHENS.

There are no traces of staircases between the cunei to be discovered in the ruins of this theatre; but in the wall which surrounds the upper praecinction there are remains of niches, or recesses, which, like the real door-ways in other theatres, were probably opposite to the ascents. Upon this supposition, their disposition would correspond very nearly with that which we are desired by Vitruvius to adopt; for the ascents would begin from the angles of the squares inscribed in the circle of the orchestra.

It will be seen on referring to the plan, that the cunei on the right and left of the scene were of greater extent than the others; a similar inequality is likewise apparent in the plan of the theatre at Tauromenium; and seems to have been dictated by the propriety of giving the same facility of access to all the cunei. The staircases at the extremities of the cavea afford access to the seats of the two cunei only contiguous to them; whereas each of the others communicates with those of the two cunei which it separates: so that were the cunei of equal extent, the facility of approaching the seats of those next the extremities would be greater than what was afforded to the others.

The theatre having been excavated in the side of the rock of the Acropolis, there were no other approaches to the praecinctions than those at the back of the scene.

The orchestra is the segment of a circle greater than a semicircle. It is probable that Vitruvius had a theatre similar to this in view when he represented the orchestra of the Greek theatres as formed by arcs described from three several centres. The form of the orchestra in the theatres at Stratonicea, Miletus, Laodicea and Jassus, was a considerable portion of a circle.

# PLATE VIII.

## PLAN OF THE BATHS AT BADEN-WEILER.

There is perhaps no instance remaining of Roman baths which will so well illustrate the description Vitruvius gives of them, as those at Baden-weiler; a plan of which is the subject of this plate.

The baths described by our author were buildings of much less importance than the thermae, which were introduced during the reign of Augustus by Agrippa.

The thermae contained not only apartments for bathing, but likewise exedrae, xysta and every other part of a Greek palaestra, which Vitruvius enumerates. The most celebrated were those of Domitian, Antoninus and Dioclesian.

The building of which we are now treating, contained a set of baths for men and women; with the several apartments generally attached to them. The plan is copied from that given by Rode in the Berlin edition of Vitruvius.

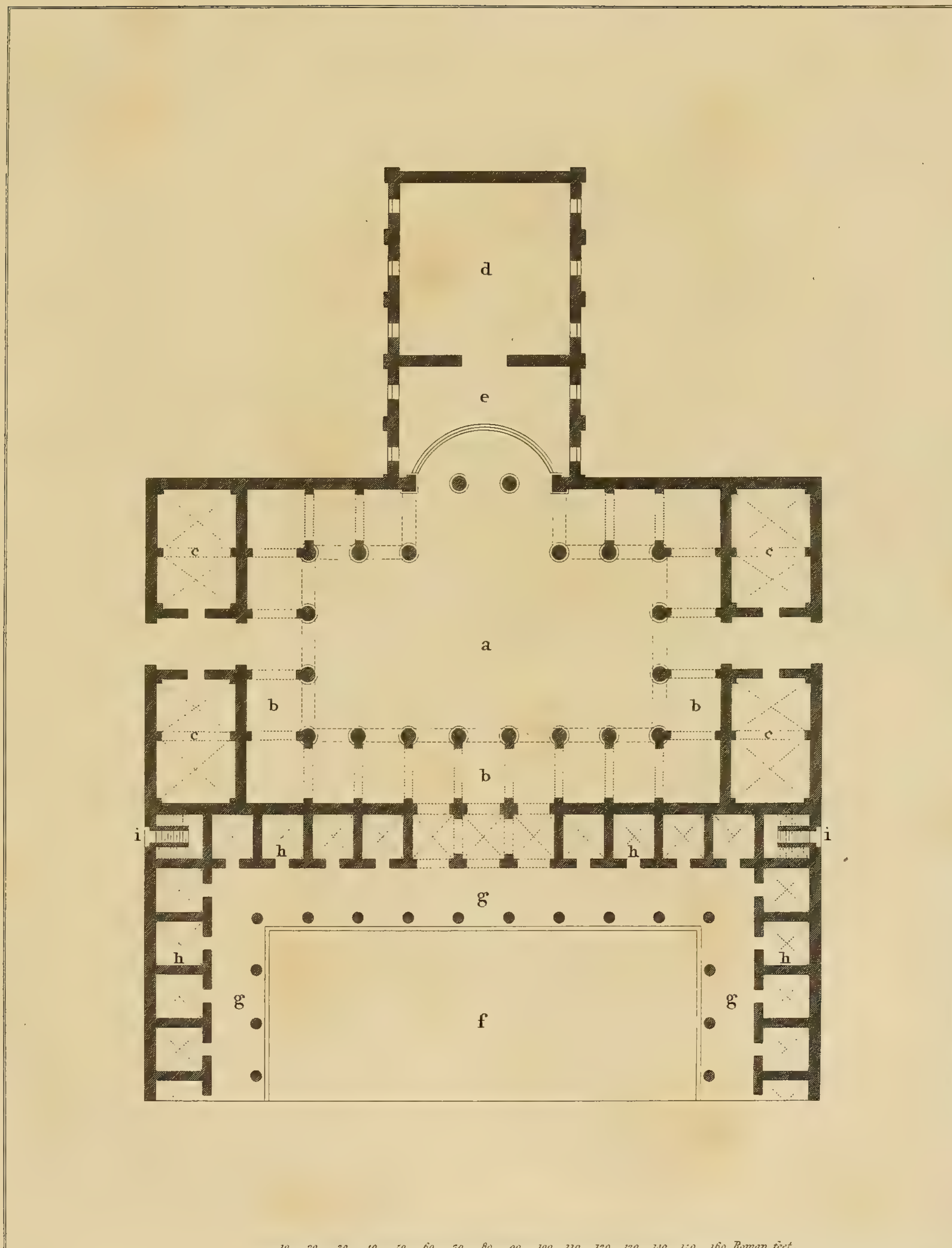
a.a.....Hypocaust.
b.......Furnace.
c.c.....Caldaria.
d.d....Vaulted sudatories.
e.e....Tepidaria.
f.f.....Frigidaria.
g.g...Rooms which had floors like those of the caldaria; heated by the stoves l.l.
h.h...Vestibules.
i.i.....Elaeothesia.
k.k...Exedrae.

## PLATE IX.

### PLAN OF THE PALAESTRA AT EPHESUS.

In the observations already made upon the eleventh chapter of this section, it has been remarked, that the palaestra has hitherto been represented as consisting of a court surrounded by peristyles; after the manner of the great courts of a Greek house. Such a disposition is there shewn to be erroneous. The remains of a building at Ephesus, which is known by the appellation of the Gymnasium, prove that the apartments, forming the palaestra of the Greeks, were comprised within the area surrounded by the porticoes. At Alexandria Troas there are also considerable remains of a building of this kind; from which it is apparent that the disposition of the parts was originally similar. In this latter the arcades, or porticoes, were open all around; but in the Gymnasium at Ephesus they were closed on every side; forming, what was termed, a *cryptoporticus*.

a.a.....Porticoes full of exedrae.
b.......The interior portico on the south.
c.......Ephebeum.
d.......Elaeothesium.
e.......Apodyterium.
f.......Second elaeothesium.
g......Second apodyterium.
h.....Hypocaust.
i.i....Vaulted sudatories; at one end of which was the warm water bath, and at the other the laconicum.
k.k..Tepidaria.
l.l....Frigidaria.
m....Sphaeristerium.

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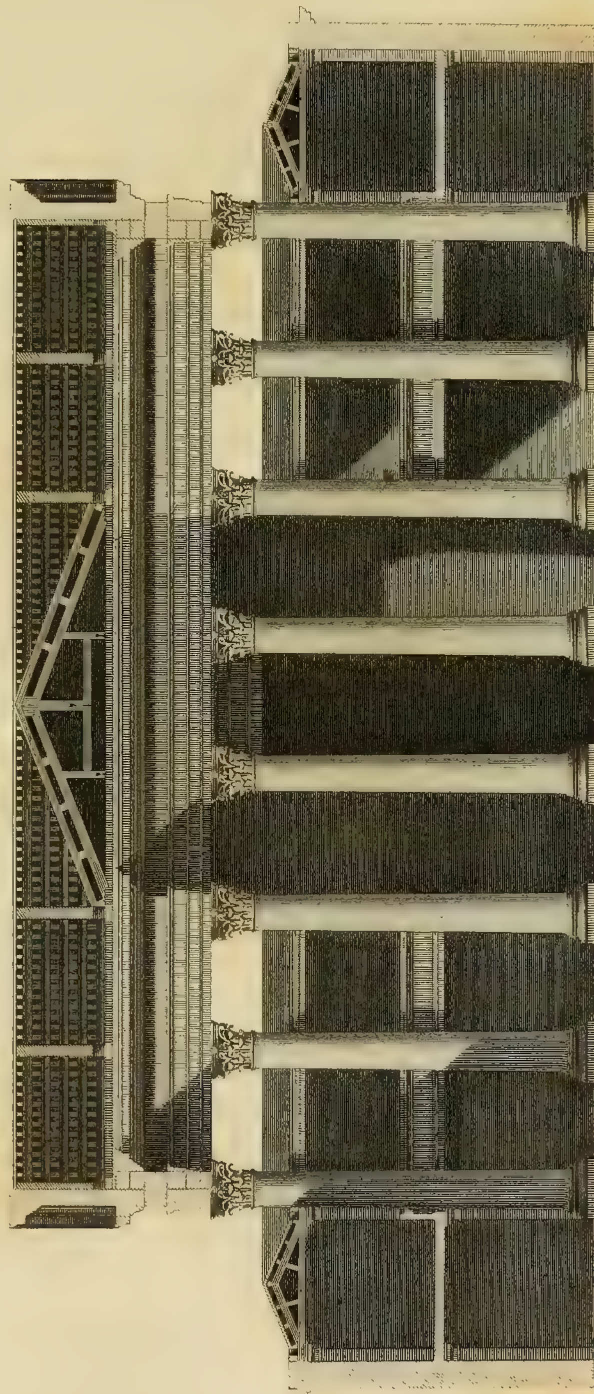

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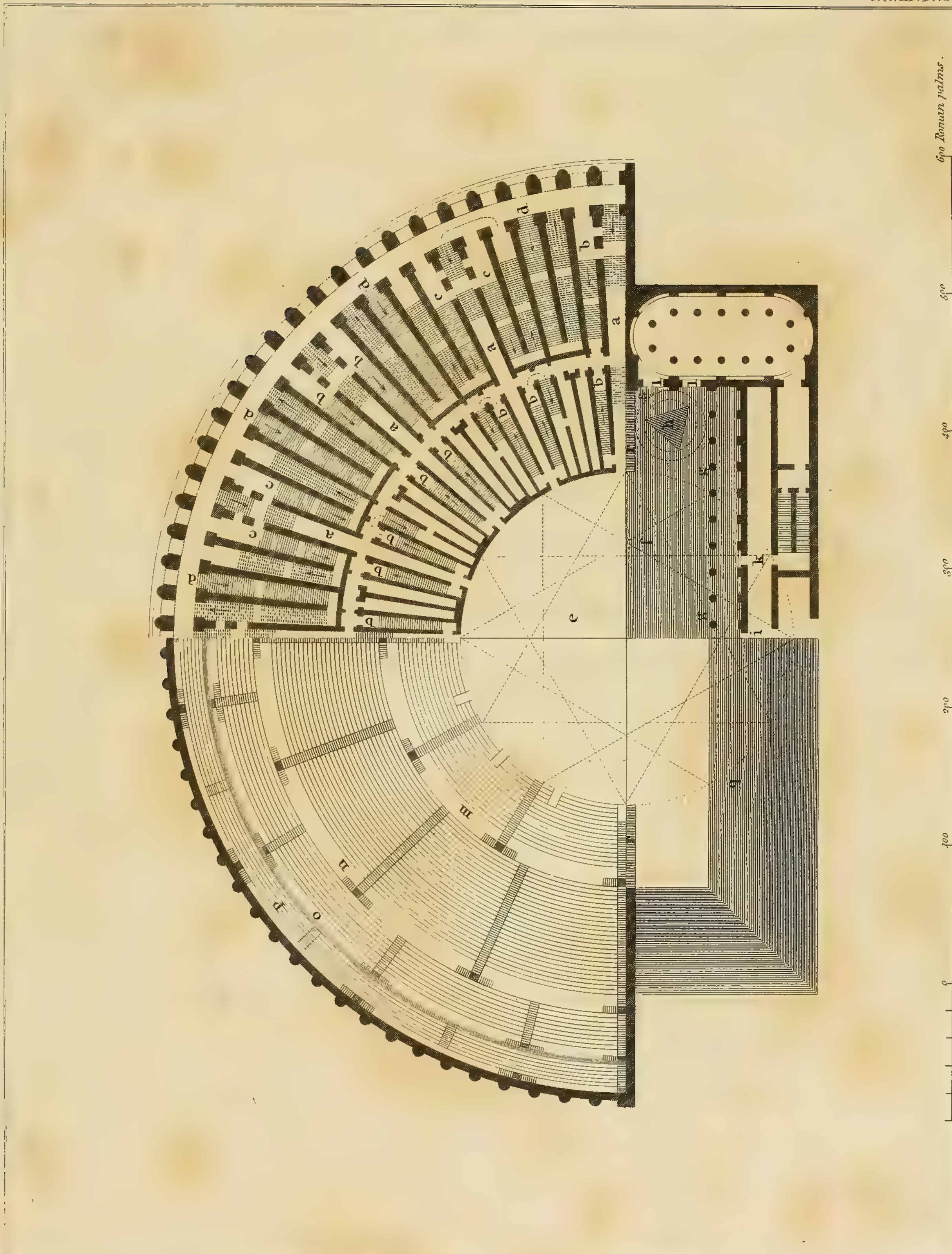


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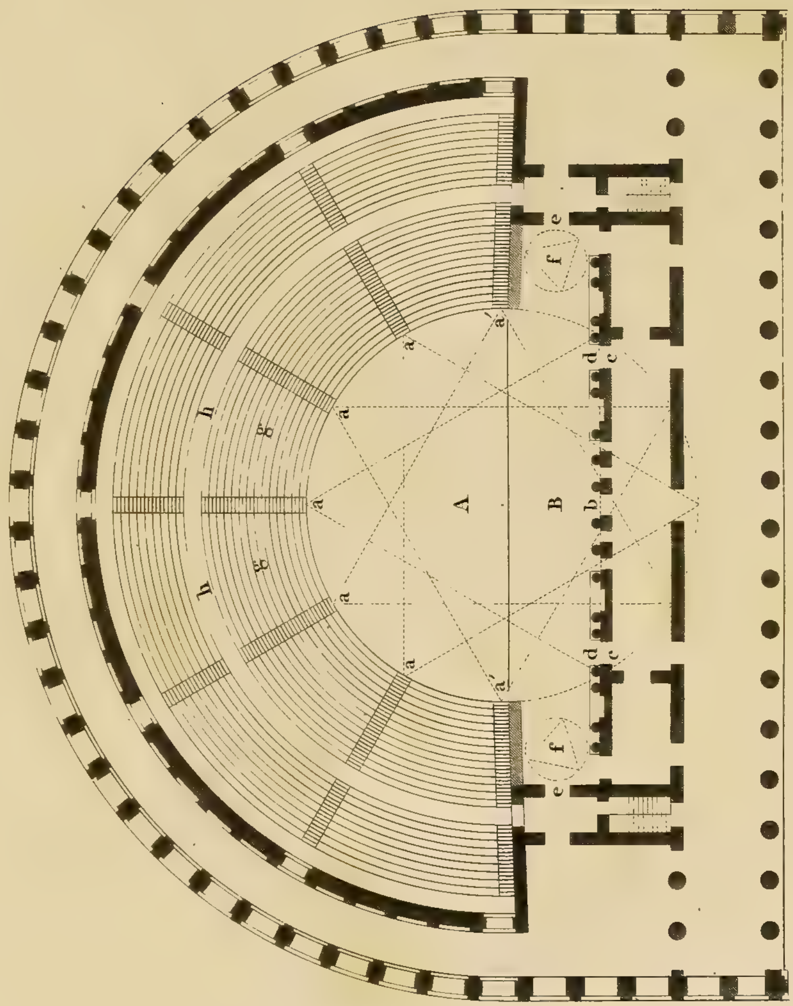


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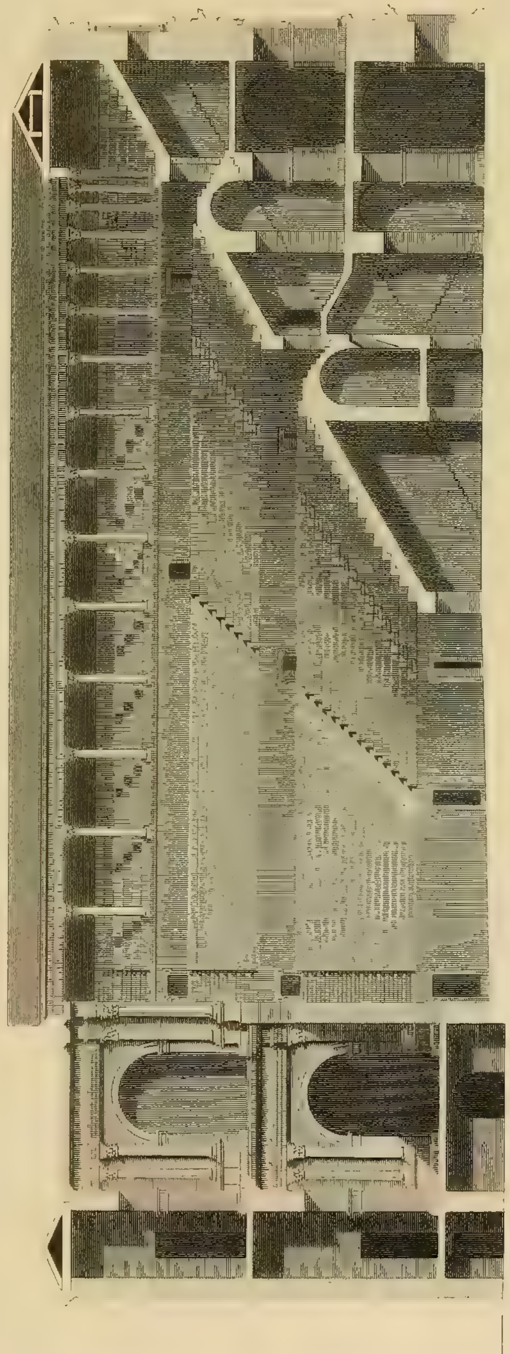
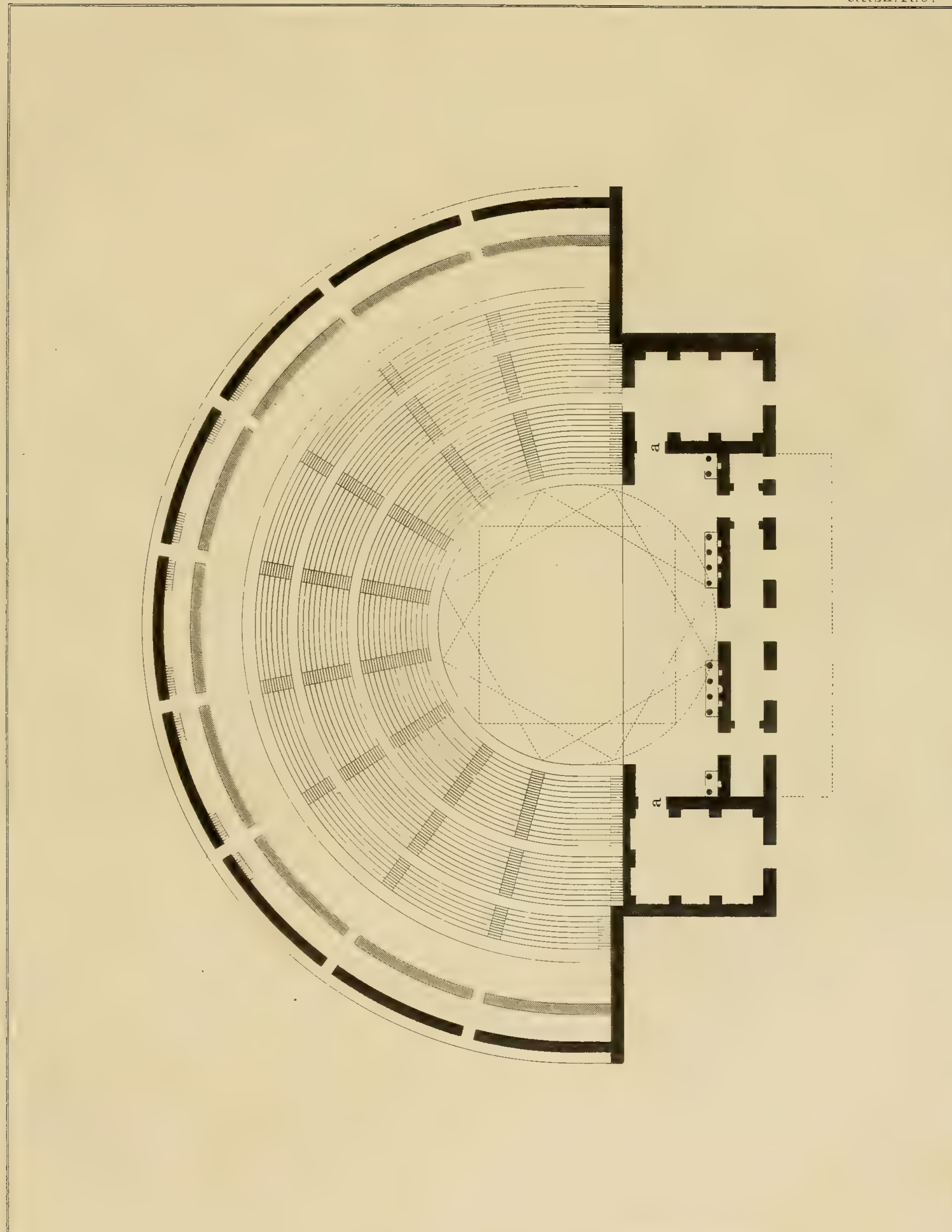


S. Porter. sculp.

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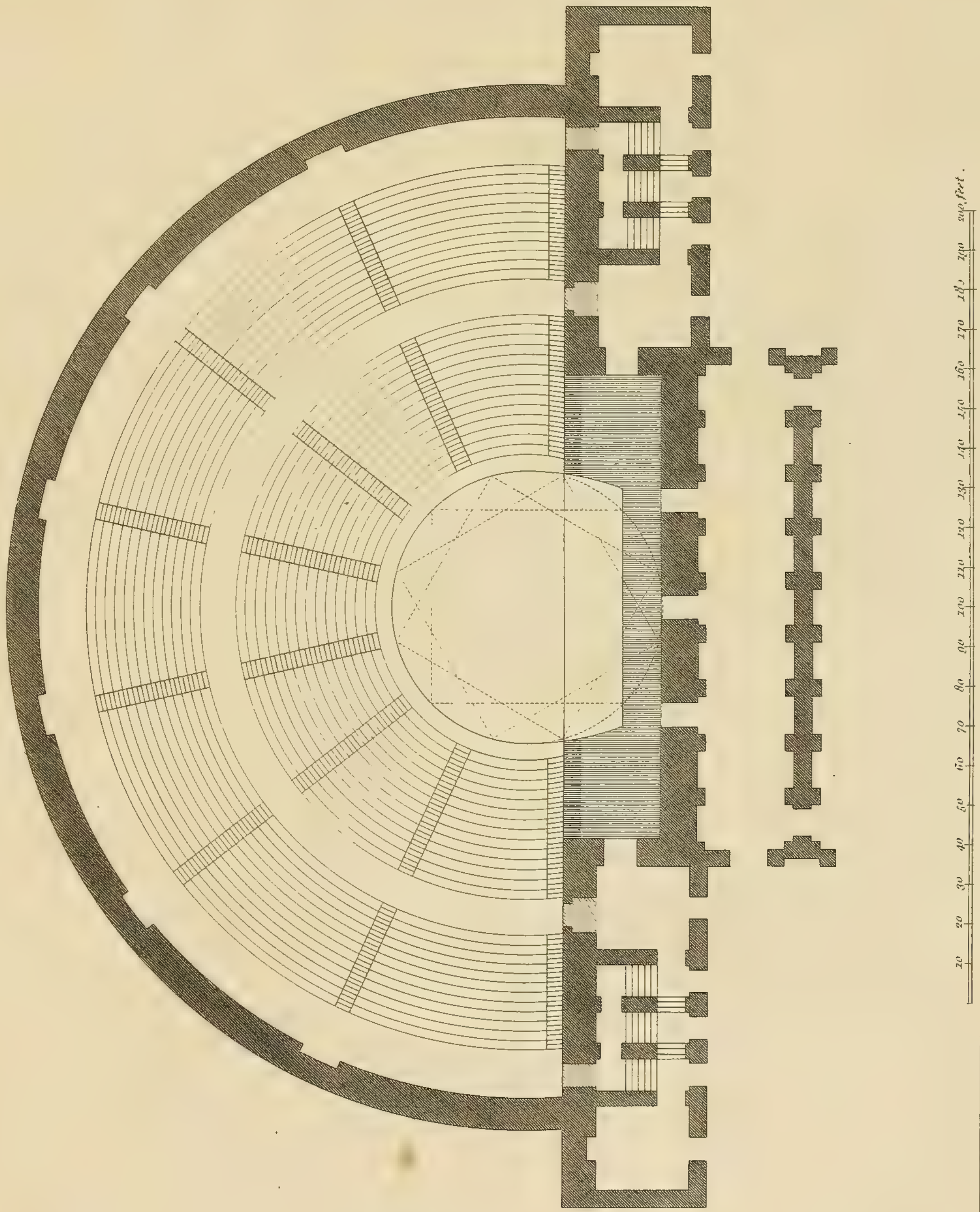

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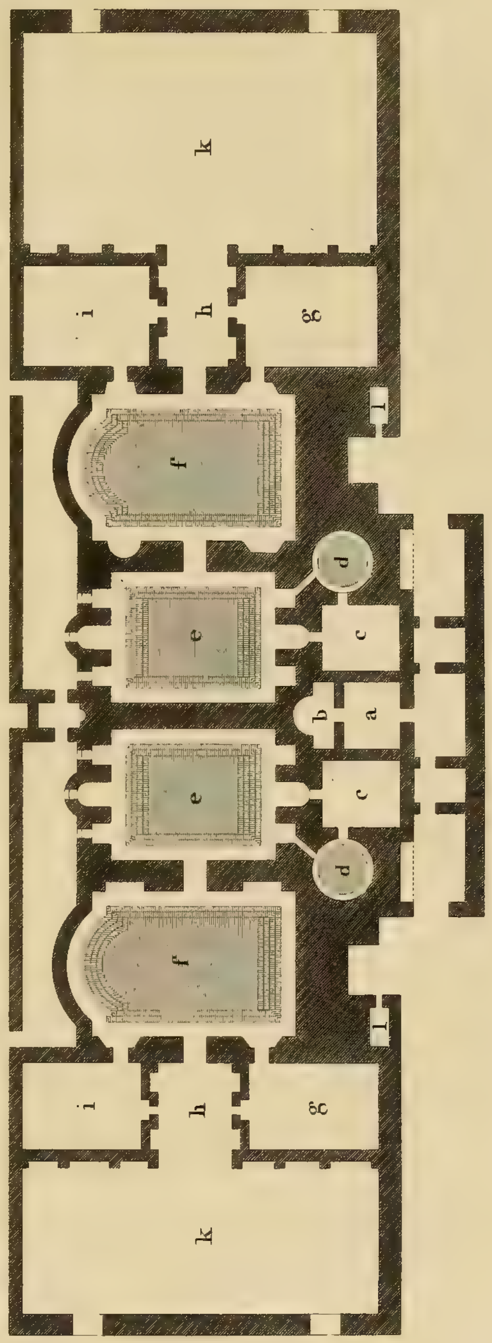


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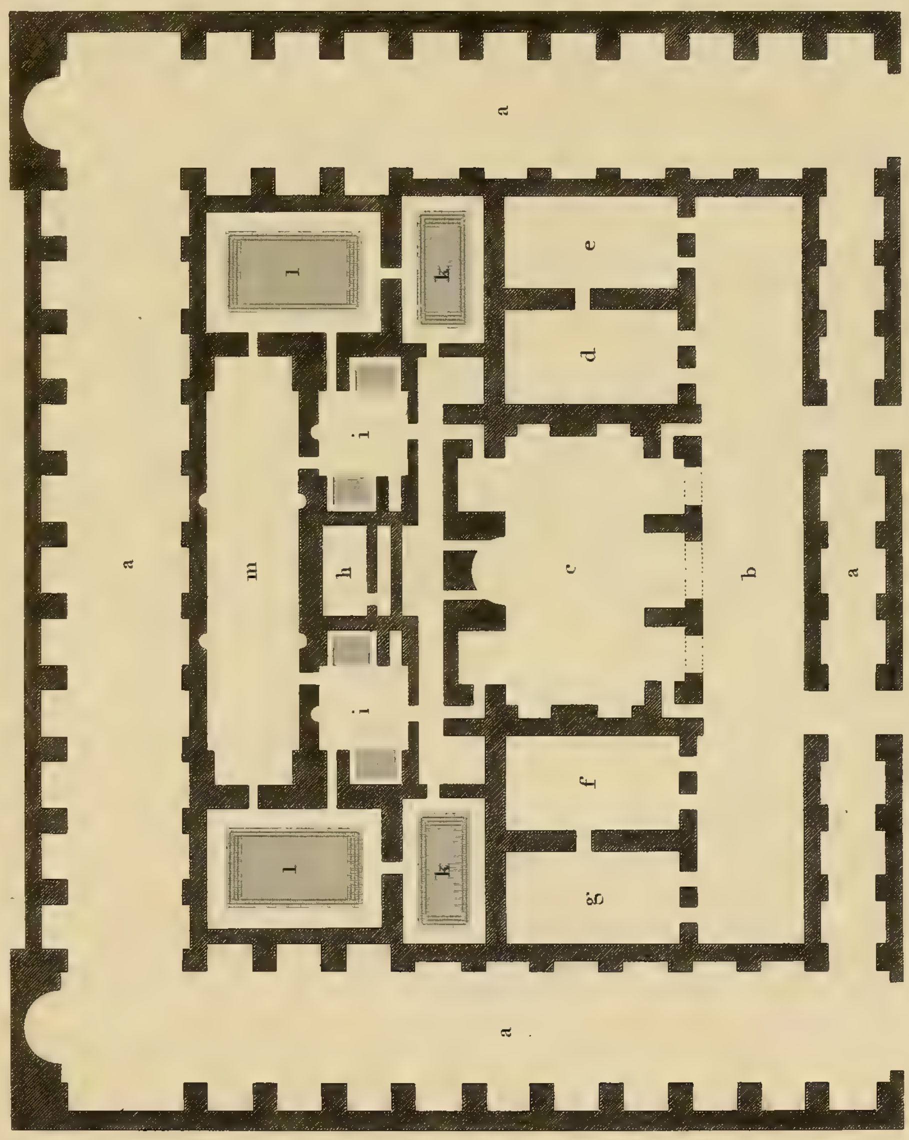


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THE

# CIVIL ARCHITECTURE

OF

# VITRUVIUS.

## SECTION IV.

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OF

# VITRUVIUS.

## SECTION IV.

### CHAP. I.

#### ON THE MODE OF ADAPTING BUILDINGS TO VARIOUS CLIMATES.

THE manner in which we arrange the several parts of private houses, should be made subservient to our position upon the earth's surface conjointly with the nature of the climate. Egypt should have a mode of building peculiar to itself; Spain another; Pontus a third; and again Rome another: and generally in all countries the method of building ought to depend upon local circumstances.

In some countries the heat of the sun is frequently oppressive; in others it is scarcely felt: again in others the temperature is a mean between these extremes. Since, therefore, different spots upon the earth's surface are unequally affected by the inclination of the poles and the sun's motion through the zodiac, it follows, that the aspects which buildings are made to assume should have a certain relation to the position of the country upon the globe, and the climate to which it is exposed by its situation.

In northern regions houses ought to be built with covered courts, and sheltered as much as possible; and their aspects towards the quarters most exposed to the action of the sun. On the other hand, the houses of more southern countries, or hotter climates, should have open courts, and the apartments made to face the north or north-east: so that in either case the natural inconveniences of the climate may be obviated by the judicious disposition of the houses; for it is generally in our power to qualify the disadvantages of situation, however affected by the inclination of the earth's axis, by adopting precautions of this nature.

In order to accomplish this end it will be necessary to investigate the nature of the climate, and even to study the construction of the frame and limbs of the natives. In those countries where the heat of the sun's rays is not so intense as to disperse entirely the vapours arising from the earth, the bodies of the inhabitants retain a proper degree of temperament: and in those which are parched by excessive heat, the natural humours of the body are exhausted. On the contrary, in cold climates and in regions remote from the south, the heat is not sufficiently powerful to effect the dispersion of vapours; on this account the atmosphere is charged with damps, and causes an accumulation of the humours of the system; by which the body is rendered corpulent, and the tones of the voice bass. From this cause it happens that the inhabitants of northern regions have a large stature, and fair complexions, their hair straight and red, their eyes blue, and their veins full of blood; all of which characteristics are to be attributed to the prevalence of damps, and the coldness of the climate. In those countries which border upon the equator, and are exposed to a vertical sun, the natives have a low stature and dark complexions; their hair curled, their eyes black, their limbs weak, and their blood vessels empty; all of which peculiarities originate in the heat of the climate. Owing to the deficiency of blood the natives of these countries are apprehensive of wounds; but they endure calentures and fevers without much inconvenience, because their limbs are inured to heat. For reasons of a similar nature the inhabitants of cold countries are fearful of encountering heat and fevers; but are regardless of wounds by which the copiousness of blood is diminished.

The tones of the voice amongst different nations vary in the same degree, and observe a gradation corresponding to the different inclinations of the circle, termed by mathematicians the horizon, which forms a boundary between the upper and lower divisions of the system of the world, and is crossed by the sun at rising and setting. In order to comprehend this, let a line be drawn from the northern point of the circle to that at the extremity of the southern axis; and from this another, in an oblique direction, to the north pole; these lines will form a diagram, resembling in form the musical instrument which the Greeks call *sambuca*. The less therefore the distance is from the lower pole to the southern point of the axis, the more acute and shrill are the tones of voice among the nations, the elevation of whose pole it designates:

analagous to the sounds of those chords which are nearest the angle of the instrument. In the same manner the nations more remote, those in the middle of Greece for example, have the tones of the voice softer, as the lower axis keeps advancing towards the north point; and as the elevation of the poles increases, the tones of the inhabitants increase in deepness, from the nature of their situation upon the earth's surface.

Thus the whole conformation of the globe with regard to the influence of the sun upon the human frame, seems to have been regulated upon the principles of harmonic progression; the gradations in the tones of the voice observing a certain proportion to the different elevations of the pole, which produce different modifications of the sun's powers. Those nations, therefore, where the lower pole is equidistant from the northern and southern extremities of the meridional axis have mean tones of voice, analogous to the middle chords of the musical instrument. As they approach the north, the lower pole constantly receding from the southern point, the voice is affected by the moisture of the climate, and, by the same natural causes, the inhabitants are compelled to utter tones according with the hypate and proslambanomenos: and, as the lower pole approaches the southern point, the inhabitants of the countries express themselves by tones, which are shrill and weak, like the paranete and nete.

The truth of the position here assumed, that humid climates render the voice bass and deep, and, on the contrary, that climates exposed to the great heat of the sun render it sharp, may be demonstrated by the following experiment.

Two vases of equal weight, and hardened by the same degree of heat, when struck, will emit similar sounds: if one of them be immersed in water and afterwards emptied, they will be found to be of unequal weight; and when struck will produce different tones. Thus it is with the human frame; for although the principles of its formation are invariably the same, and it is composed of the same elements, yet in some climates the voice is rendered acute by the heat, and in others it assumes a deep tone from the prevalence of moisture. For reasons nearly similar, the inhabitants of southern regions, through the fineness of the atmosphere occasioned by the intensity of heat, possess lively imaginations and rapidity of thought: on the contrary, the inhabitants of the north, inhaling a denser atmosphere, have their intellectual powers rendered inert by the qualities of a climate charged with moisture. This truth is made evident by the natural history of the serpent tribe; for these animals, when the cold humours of the body are dissipated by the warmth of the season, are active; but in cold weather and in winter the change of atmosphere chills the humours, and they relapse into a state of torpidity. Hence it is not surprising that heat should invigorate the intellects of man, and cold render them inert.

Although the inhabitants of southern nations are gifted with powers of discrimination, and are celebrated for their prudence, they are deficient in courage; their bodily faculties being affected by the heat of the climate. On the other hand, the natives of northern regions are prone to war, and encounter the greatest perils without dismay; but, being hurried on by imprudence, their measures are adopted without premeditation, whence their enterprises seldom succeed.

Thus by the ordinance of nature, the human frame in different parts of the world is formed by very unequal mixtures. The Romans have been placed by the ruler of the universe in the middle regions between the extremes: on this account the natives of Italy possess those qualities of mind and body which result from an equal mixture of the opposite temperatures: so that strength of body and vigour of mind are given to them instead of mere personal courage.

The position of Italy between the nations of the north and south is analogous to that of the planet Jupiter; whose orbit is situated between the torrid region of Mars and the frigid circle of Saturn. In this happy situation it enjoys an equal mixture of the attributes of both: and the faculties with which her people are endowed enable her to conquer, by stratagem, the ferociousness of the barbarians of the north; whilst the sagacity of the southern nations is unavailing when opposed to their greater courage. Thus, Heaven has placed the capital of Italy in the most desirable and temperate of climates, and thereby invested the Romans with the sovereignty of the world.

It appears, therefore, that the nations of the globe are affected in different degrees by the inclination of the earth's axis, and their inhabitants are born with different animal faculties, and with forms of various properties; hence it cannot be doubted, that their habitations should be constructed with reference to the climate and the natural qualities of the people; nature itself having clearly pointed out its propriety, and indeed necessity.

We have now explained, with as much brevity as the subject would allow, the qualities and properties of different regions arising from the nature of their situation; and likewise how we ought to adapt the nature of our buildings to the sun's course, and the inclination of the earth's axis. We shall proceed shortly to explain the proportions of the constituent parts of houses, taken generally and in detail.

## CHAP. II.

### OF THE PROPORTIONS OF PRIVATE HOUSES.

Nothing ought to engage the attention of an architect more than the proportions of all the parts in the houses he constructs. After having determined upon such proportions as the necessity for the commensuration of the parts with the entire building seems to require, the greatest judgment must be exercised in adapting them to the nature of the spot, the use to which the edifices are designed, and the appearance they ought to assume. And this must be done by making such additions or deductions that although the proportions are not strictly what they ought to be, the eye may not be conscious wherein they fail.

The same objects appear differently under dissimilar circumstances; if near the ground or at a considerable elevation; if in a confined space or an exposed situation. Under every peculiar circumstance, great judgment is necessary in calculating the effect which will be ultimately produced.

The impression made upon the sense of seeing is not always a correct image of the object; for in a painting, columns, mutules and statues are made to appear projecting and detached; when, in fact, every object represented is in one and the same plane. In the same manner the oars of a vessel appear bent, although the part below the surface is in a straight line with the other. At the instant they touch the surface of the water they appear, as they really are, straight; but when they are in part immersed in this transparent medium, images of themselves are impelled to the surface of the water: the direction of the parts immersed therefore is apparently changed, and the sensation of bent objects is thereby created. Whether it is that the object is constantly impelling forward images of itself, or that the eye emits rays, whatever opinion philosophers adopt, it is evident that a false impression is made upon the sense. Since, therefore, objects sometimes assume an appearance of being otherwise than they really are, it will not be denied that additions and deductions may be made, as the nature of the situation or the exigences of particular occasions require, in such a manner, that the deviation from the general laws of proportion will not be perceptible. This deception may be effected by the exercise of the faculty of reasoning, and cannot be taught by precepts alone.

It therefore becomes necessary in the first place to institute laws of proportion upon which all our calculations must be founded: according to these the ground plan, exhibiting the length and breadth of the whole work and the several parts of it, must be formed. When the magnitude of these is once determined, the parts must be arranged so as to produce that external beauty which suffers no doubt to arise in the minds of those who examine it as to the want of proportion in any part. How this may be effected remains to be stated: we shall begin with the explanation of the manner in which cavaedia should be constructed.

# CHAP. III.

## OF CAVAEDIA.

There are five kinds of cavaedia which, from their mode of construction, are severally denominated, Tuscan, Corinthian, tetrastyle, displuviatum and testudinatum. They are termed Tuscan, when the beams, which are thrown across the court, have timbers and gutters extending diagonally from the angles made by the walls of the court to those made by the junction of the beams: and the rafters of the eaves are made to incline every way towards the centre of the compluvium [1]. The timbers and compluvia of Corinthian cavaedia have a disposition in all respects similar; but beams are made to project from the walls, and are supported upon columns arranged around the court.

A tetrastyle cavaedium has columns placed at the angles

[1] The compluvium was the open space, comprehended between the gutters of the roofs over the porticoes, or covered passages, on the four sides of the court, which admitted the rain. The commentators of Vitruvius have for the most part given explanations of the compluvium differing from each other. Varro, in describing the cavaedium, introduces the following passage: "Si relictum erat in medio, ut lucem caperet, deorsum, quò impluebat, impluvium dictum: et sursum, quà impluebat, compluvium: utrumque a pluvia." Whence it appears that the compluvium was the open part through which the rain was admitted, and the impluvium the area of the court upon which it fell. In the latter part of the fourth chapter, the MSS. of Vitruvius describe this opening as the "lumen compluvii." The printed copies, through a misconception of the meaning of the term *compluvium,* are obliged to substitute *impluvium* for it; a word no where used by our author.

where the beams meet, which afford them great support: they also obviate the necessity of using beams of a considerable length, and relieve them from the pressure of the diagonal timbers.

The cavaedium displuviatum is that kind in which the timbers, supporting the gutters, are so inclined, that the water dripping from the eaves is thrown back towards the walls [1]. This kind is favourable to the admission of light into the winter triclinia, because the compluvium is elevated: but on the other hand, great inconvenience arises from the necessity of constant repairs; for the pipes which convey away the water flowing from the eaves and from the gutters surrounding the walls, do not always discharge themselves sufficiently fast. The water, therefore, overflowing the gutters, decays the wood-work and injures the walls.

The cavaedium testudinatum is used where the width of the court is not very great: and spacious apartments are constructed over them.

[1] Various conjectures have been offered as to the manner in which the porticoes surrounding the court were roofed; none of which will answer in every respect to the context. There cannot be any doubt that the roofs of the cavaedium displuviatum, in contradistinction to those of the other kinds of cavaedia, were inclined towards the walls of the court; by which means the rain, falling from the eaves above upon the roofs of the porticoes, was reflected towards the walls. The words of Vitruvius are as follows: "Displuviata autem sunt in quibus deliquiae, arcam sustinentes, stillicidia rejiciunt." The foregoing supposition is confirmed by a subsequent passage, in which an objection to this mode is stated to arise from the probability of the gutters overflowing, and damaging the walls: whence it is evident that the gutters must have been adjoining the walls. See the explanation of Plate I.

## CHAP. IV.

### OF ATRIA, TABLINA AND PERISTYLES.

Atria are constructed of various forms, the proportions of the width to the length being determined in three several ways: one of which is by dividing the length into five parts, and making the width equal to three of them. Another mode is to divide the length into three parts, and to assume two for the width. The third mode is to proportion the length to the width by describing a square, one of whose sides is made equal to the latter; the diagonal of this square determines the length of the atrium. The height below the trabes[1] should be three fourths of the length of the atrium: the lacunaria and the gutters above the trabes occupy the remaining fourth.

The width of the alae on the right and left of the atrium should be proportioned to its length: when this is from thirty to forty feet, the width of the alae is a third of it; when the length is from forty to fifty feet, it is divided into three parts and an half, one of which gives the width for the alae. In atria whose length is from fifty to sixty feet, the

[1] By mentioning "trabes," Vitruvius means it to be understood, that the entablature over the columns of the atrium was formed of timber, in the same manner as the interior of the entablature of the basilica at Fanum. If the simae, or epitithides, be included in the height of the entablature, which was probably meant, since gutters were formed by hollowing the simae, a fourth of the height of the columns would be very nearly a just proportion for the whole entablature.

width of the alae is made a fourth of it. The length of those which are from sixty to eighty feet, is divided into nine parts, and the width of the alae is made equal to two of them. The width of the alae on the right and left of atria which are from eighty to an hundred feet long, is made equal to a fifth part of this extent. The trabes, extending from column to column of the alae, ought to be made as high as they are wide [1].

When the atrium is twenty feet wide, the tablinum is made two thirds of it: when it is from thirty to forty feet, the tablinum is half the width. The tablinum is made equal to two parts of five into which the width of the atrium is divided, when this is from forty to sixty feet. Atria of small dimensions ought not to have the same proportions as those which are very spacious; because if we were to adopt the proportions which obtain in large atria, in those which are of small dimensions, the alae and tablina would be too inconsiderable to answer the purposes for which they are designed: and, on the contrary, if we apply the proportions of small atria in building those of ample size, the alae and tablina

[1] Barbaro, Gaïiani, Palladio and Perrault agree in the supposition that this passage alludes to the height of the alae, or porticoes on each side the atrium; but they are led to this by the belief that the atrium was within the house; in which opinion the editor of the Berlin edition concurs. In our explanation of the plan of the houses of the Romans we have agreed with Pitiscus, that the atrium was the great court before the house, having on the right and left the porticoes called alae; in which were the cellae familiaricae, or rooms appropriated to domestic purposes. Vitruvius has mentioned the height of the atrium below the beams of the columns in a preceding passage: in this he alludes to the height of the beams themselves. The printed copies read " Trabes earum liminares ita alte ponantur ut altitudines latitidinibus sint aequales." *Alte* may probably have been written for *altae.*

would be colossal. I have therefore thought it expedient to state the proportions which, in all particular instances, are best calculated for convenience and beauty.

The height of the trabes, measured from the floor, should be equal to the width of the tablinum, with the addition of an eighth part: and the height of the lacunaria equal to the same width increased by its third part.

In atria of small dimensions the entrance[1] is made two thirds the width of the tablinum; and in spacious atria it is half the width. The statues with their ornaments should be equal in height to the width of the alae. The proportions of the height and width of the door-ways depend upon the order of architecture: whether this be Doric or Ionic the proportions must be determined according to the principles already given for the thyromata of different orders, in the second section.

The compluvium of the cavaedium, through which the light is admitted, ought not to be more than a third of the width of the atrium nor less than a fourth; the length must be determined in the same manner as that of the atrium.

The peristyles should be greater in extent, measured transversely, than in length: the columns equal in height to the width of the porticoes of the peristyles; the

[1] The "fauces" meant probably the entrance from the vestibule into the atrium; corresponding to the thyroreum of the Greek house; which Vitruvius calls a passage of inconsiderable width. The word is used by Virgil in this figurative sense,

"Angustaeque premunt fauces aditusque maligni."

The porter's cells were on one side of the thyroreum of a Greek house.

intercolumniations of which ought not to be less than three nor more than four diameters. But if columns of the Doric order are introduced in the peristyle, the modulus must be assumed in the manner related in the second section; according to which the disposition of the triglyphs is necessarily determined.

# CHAP. V.

## OF TRICLINIA, OECI, EXEDRAE AND PINACOTHECAE.

The length of triclinia should always be made double the width. The height of all apartments, which are longer than they are wide, is determined by making it half the sum of the length and width added together. When, however, the plan of the oecus and exedra is a square, the height is made greater in proportion by the addition of half the width. The pinacotheca, as well as the exedra, ought to be of ample dimensions. The kinds of oeci, which are termed Corinthian and tetrastyle, and those which are called Egyptian, ought to have the same proportions as triclinia; but their actual dimensions should be much greater, because columns are introduced in them. There is this difference between Corinthian and Egyptian oeci: the Corinthian have a single range of columns in height, only, all around; which is either elevated upon a podium or rest upon the floor; and epistylia and coronae, constructed either of wood-work or stucco, are placed over them. The lacunaria above the coronae are vaulted, and the ribs made in a circular form. But in the Egyptian, above the columns are epistylia; and from the epistylia, extending to the walls, is a paved floor, forming a platform around, which is exposed to the air. A second range of columns is placed above the epistylia, immediately over the columns of the lower range; a fourth part less in height. Upon the epistylia and coronae of these columns the lacunaria are arranged; and windows are inserted in the intervals between the columns, so that the oeci seem intended for basilicae rather than Corinthian triclinia.

# CHAP. VI.

## OF OECI AFTER THE MANNER OF THE GREEKS.

There are likewise oeci built in a manner different to what is generally adopted in Italy: these are called by the Greeks *Cyziceni.* They are situated so as to face the north, and have generally their windows towards the garden, with doors in the centre. Their length and width are such that two triclinia, facing each other, may be placed in them, with ample space around them. Folding windows are inserted on the right and left of these apartments, in order that the gardens may be within the view of those who are reclining upon the couches. The height of these oeci is made half as much more than their width.

In these various kinds of buildings the proportions here related are to be observed if no local impediments interfere. There will be no difficulty in making them airy where there are no high walls to intercept the light. But if any difficulties occur, through the want of space or other circumstances, then there will be occasion for the display of judgement, by making additions or diminutions so as to produce the same general effect as would result if every part were proportioned according to the laws of perfect symmetry.

## CHAP. VII.

### OF THE ASPECTS, BEST ADAPTED TO CONVENIENCE AND HEALTH, FOR THE DIFFERENT KINDS OF BUILDINGS.

THE principles which should be attended to in allotting to each kind of building an appropriate aspect, remain to be explained.

The winter eating-rooms and baths ought to face the winter-west; because the use of them requires that they should be light at the time of the sun's setting: besides which the western sun being immediately opposite to them, renders their temperature mild at the close of the day. The sleeping apartments and libraries should be made to front the east; because the morning light is necessary for them; and books are better preserved when the air and light are received from that quarter. When libraries have a southern or a western aspect they admit those winds; which, at the same time that they carry with them moths, instil also damp vapours into the books, which, in process of time, cause their decay.

The vernal and autumnal triclinia should face the east, because the windows being turned from the sun's rays, whose heat increases as the sun advances towards the west, their temperature is cool at the hours they are generally used.

The summer triclinia should front the north; because having that aspect they will be least exposed to the sun; and the temperature of the apartments will be grateful, at the same time that it is conducive to health: no other aspect possesses equal advantages; for the sun during the solstice would render the air of all others sultry. This aspect is necessary for pinacothecae, and the apartments in which the pursuits of embroidery and painting are followed: because the colours used in works of this kind retain their brightness longer when exposed to an equable and regular light.

# CHAP. VIII.

## OF THE KINDS OF HOUSES SUITABLE TO THE DIFFERENT RANKS OF THE COMMUNITY.

Having determined upon the aspects which the different apartments ought to have, it becomes expedient to consider by what rules we are to be governed in the arrangement of those parts of private houses, which are exclusively appropriated to individuals of the family: and in what manner these ought to be connected with the apartments into which strangers are admitted. For there are several parts of a house which may not be approached by those who are not of the household, unless expressly invited: such as the sleeping rooms, triclinia, baths, and those apartments which are in general use. The parts which are accessible to all, and into which any person may enter uninvited, are, the vestibule, cavaedium, peristyle, and whatever others are built for purposes of a similar nature. Neither magnificent vestibules, tablina nor atria, therefore, are necessary in the houses of those of moderate fortune; for such are clients of the rich, and are without dependants upon themselves.

Those who expose to sale the produce of the country, should have shops and stables at the entrances to their houses; and within them cellars, granaries, storehouses, and other apartments calculated for the preservation of their merchandize; without any regard to propriety of appearance.

The houses of bankers, and those who farm the revenue, should be upon a scale of greater magnitude; respectable in appearance, and secured against depredations. The houses of lawyers, and men distinguished by their eloquence, ought to be more elegant and spacious for the accommodation of those who resort to them for advice and instruction.

The nobles, in whom is vested the discharge of the duties of the magistracy, should have their houses constructed with splendid vestibules, lofty atria and extensive peristyles; with plantations and spacious walks disposed with every attention to magnificence of appearance. Besides which they should have libraries and picture galleries; and in some instances basilicae, upon a scale of grandeur little inferior to that of national buildings: for it often happens that public meetings are held there, and the causes of individuals heard and determined.

If therefore houses are arranged according to these principles, and with attention to those laws of propriety, which indicate what is consistent with the different conditions of men, every thing that convenience requires and experience suggests will have been accomplished.

The same principles will equally apply to houses of the same kind built in the country: we must however vary the arrangement of the parts; because in the city it is necessary that the atrium should be contiguous to the entrance; but in the country, when houses are intended to resemble those in the city, the peristyle should be next the entrance; and then the atrium, surrounded by paved porticoes, commanding a view of the palestra and walks.

The manner of constructing the dwellings of those who live within the city, being described in a general way, let us now proceed to treat of the proper situation for houses to be built in the country; and shew by what means they may be made subservient to the purposes for which they are designed.

# CHAP. IX.

## OF THE PARTS AND PROPORTIONS OF THE FARM.

The nature of the situation, wherein it is proposed to build, ought to be investigated with the same regard to healthiness as would be thought necessary in selecting a proper site for a city. The magnitude of the buildings must depend wholly upon the quantity of land attached to them, and upon its produce. The number of courts and their dimensions must be proportioned to the herds of cattle and the quantity of oxen employed. The kitchen should be situated in the warmest part of the court; and the stable for the oxen contiguous to it: the stalls should be made to face the hearth and the east; because when oxen are constantly exposed to light and heat they become smooth-coated. No husbandman, however ignorant, will suffer cattle to face any other quarter of the heavens than the east. The width of the stables ought not to be less than ten nor more than fifteen feet: their length proportioned to the number of yokes; each of which should occupy an extent of seventeen feet. The scalding-rooms should adjoin the kitchen, in order that the operation of cleaning the utensils may be performed upon the spot.

The press-room should likewise be near the kitchen, for then it will be conveniently situated for the preparation of oil. The wine cellars should adjoin the press-room, and have their windows facing the north; for if they were exposed to the sun, the wine would be affected by the heat, and become vapid. The store-rooms in which oil is kept should be made to face the south, so that they may receive their light from the warmer quarters of the heavens; because oil is injured if suffered to congeal, but tempered by exposure to a certain degree of heat. The size of these rooms must be proportioned to the produce of the olive and vine-yards; and to the number of casks which contains it. Every vessel containing twenty amphorae will occupy four feet. If the presses be worked with levers and beams, without the aid of screws, the press-rooom ought not to be less than forty feet long; in order to afford space for the action of the levers: nor should its width be less than sixteen feet; for then those who are employed at the press will not have their operations obstructed through want of room. If it be necessary to have two presses, the width of the room should be twenty-four feet.

The courts for sheep and goats should be so spacious as to allow not less than four and an half, nor more than six feet, to each animal.

The granaries should be above ground, and made to front either the north or north-east, in order that the grain may not be liable to ferment; but, on the contrary, by exposure to a cold atmosphere, may be preserved a long time. All other aspects encourage the propagation of worms, and insects destructive to grain.

The stables should be built in the warmest part of the villa most distant from the hearth: because when horses are stalled near fire they become rough-coated. It is likewise expedient to have stalls for oxen at a distance from the kitchen, in the open air; these should be placed so as to front the east: because if they are led there to be fed in winter, when the sky is unclouded, they will improve in appearance. The barns, the hay-yards, the corn-chambers and the mills ought to be without the walls; so that the farm may be less liable to accidents from fire.

If it be desirable that farm-houses should possess a certain degree of the magnificence of habitations in the city, the same disposition of parts which obtains in these may be applied to them; provided the arrangement be not such as to defeat the purposes of utility, which ought to be the chief consideration in the construction of country houses.

Great attention must be paid to render buildings of every description sufficiently light. No difficulty in accomplishing this end will occur in country houses: but in cities the proximity of divisional walls, and the limited areas to which houses must necessarily be confined, make it difficult to obviate the insufficiency of light. In order to ascertain where the apertures should be made so that an apartment may receive a proper degree of light from a particular aspect, a line must be drawn from the summit of the wall which opposes its free admission, to that point where it is most required: if apertures can be made above this line, they will permit a considerable portion of the sky to be seen through them, and thus the light will not be intercepted. But if beams, or lintels, or floors interfere with the openings, the light must be received from windows made above them.

Above all it must be observed, that the windows be placed so that the sky may be seen from them, otherwise the apartment will not possess sufficient airiness.

If light be so necessary in triclinia and other living rooms, it cannot be less so in passages, ascents and staircases; because in these parts, more especially, persons carrying burdens are constantly encountering each other.

The distribution of the buildings of the Romans has been here described with as much precision as was thought necessary to make it intelligible to those concerned in building. In order to give some conception of the manner in which the Greeks construct their houses, I shall next proceed to treat briefly on that subject.

# CHAP. X.

## OF THE HOUSES OF THE GREEKS.

Since the customs of the Greeks do not make the use of atria necessary, they do not build them[1]; but on entering the gates a passage, by no means spacious, presents itself; on one side of which are the stables, and on the other the apartments of the porter. This passage is terminated by the inner gates, and is termed by the Greeks *thuroreion:* the gates give admission to the peristyle.

The peristyle has porticoes built on three sides: on the fourth, which fronts the south, there are two antae placed a considerable distance asunder, supporting beams: two thirds of the interval between the antae are given to the breadth of this area, which is called by some *prostas,* and by others, *pastas*[2]. Near this place great apartments are constructed within, in which the mistress of the family occupies herself

[1] The printed copies begin this chapter with the following passage: "Atriis Graeci quia non utuntur, neque nostris moribus aedificant." The latter words convey a meaning so contrary to fact, that there cannot exist a doubt but that the author has been misrepresented. On examining the MSS. I find that there is no authority for introducing the words "nostris moribus."

[2] The printed editions alter the word παστὰς, to παραστάς, imagining that the term was derived from the antae, or parastades. The MSS. however, read παστὰς, which signifies a vestibule. In the expedition of the Argonauts, when Jason arrives at the palace of Hypsipyle, the servants throw open the folding doors, and conduct him through the vestibule. διὰ καλῆς παστάδος. Apoll. Rhod. i. 789.

Herodotus uses the word παστὰς to signify the vestibule, or pronaos, of a temple of Minerva.

Παστὰς λιθίνη ἠσκημένη στύλοισι καὶ τῇ ἀλλῇ δαπάνῃ. ii. 169.

and her household at the loom. On the right and left of the pastas are small apartments termed the thalamus and amphithalamus. Around the porticoes are placed the triclinia in common use, the sleeping-rooms and the apartments of the household. This part of the building is termed Gynaeconitis.

Adjoining to this is the great peristyle, surrounded by porticoes, which are generally of equal height; although sometimes the columns of that which faces the south are made more lofty than the others. A peristyle thus constructed is termed Rhodian. This division of the house has spacious vestibules and doors of corresponding importance; the walls of the porticoes are covered with plaster and stucco, and the lacunaria are formed of wood work.

In the portico which fronts the north, the Cyzicene tridinia and the pinacothecae are situated: the libraries are in the eastern portico, and the exedra in the western. In the portico fronting the south oeci are built; sufficiently spacious to contain four triclinia, with ample room for the attendants and those engaged in the business of entertainments. In these apartments banquets are given, to which men only are invited; for it is not the custom for women to place themselves at table with the men. These peristyles are termed andronitides; because here the men may occupy themselves without being interrupted by the females. On right and left of these oeci there are small habitations, which have their peculiar gates, triclinia and sleeping rooms, for the use of guests; who are not entertained in the peristyles but in these hospitalia. For when the Greeks were more refined and wealthy, they were accustomed to have triclinia, sleeping-rooms and servants' apartments reserved for the reception of strangers: these were invited to sup on the day of their arrival; and on the following day presents were sent them, consisting of poultry, eggs, herbs, fruits and other productions of the country; and hence it was that painters in representing those things which were commonly presented to strangers, called them Xenia. In these hospitalia the traveller enjoyed the ease of his own private dwelling, free from the publicity which is inseparable from the houses built for the reception of strangers.

Between the two peristyles[1] and between the hospitalia are courts which are termed mesaulae[2]; because they are situated in the middle between two aulae. The Romans call them andrones; which is somewhat remarkable, because that term does not express the use to which they are applied either by the Greeks or Romans. For the Greeks call the oeci in which men alone are entertained *andrones;* because the women are not permitted to approach them. There are various other terms in use amongst the Romans, the significations of which are at variance with their application by the Greeks; such as xystus, prothyrum, telamones and

[1] The printed copies read " Inter haec autem peristylia et hospitalia," supposing the mesaulae to have been between the andronitis and the hospitalia: but the MSS. read " Inter duo autem peristylia et hospitalia," which shews that the mesaulae were situated between the two peristyles and likewise between the hospitalia. The reason of their being termed *mesaulae* was because they were between the two aulae, or peristyles, as the concluding part of the passage explains.

[2] Vitruvius describes the *mesaulae,* as *itinera,* or passages; they were, however, smaller courts. The *mesaulae* are mentioned by Apollonius Rhodius, who, describing the reception of the Argonauts in the palace of Aeetes, conducts them first into the vestibule, then through the folding gates into the *mesaula;* which had thalami here and there, and a portico, αἴθουσα, on every side.

some others. The word *xustos* with them is applied to a spacious portico in which the athletae exercise themselves during winter: the Romans, on the contrary, term the hypaethral walks xysti, which are called *peridromides* by the Greeks. With them likewise the word prothyra signifies the space before the doors of their vestibules, but with us it means that which they call *diathura.* Moreover, the figures which are made to support mutules and coronae are termed by us telamones: but wherefore they should be thus called no conjecture can be formed from any thing which history has left us. Amongst the Greeks such figures are termed *atlantes:* for Atlas is represented in history as supporting the globe; because he was the first to discover, by the aid of great genius and application, the courses of the sun and moon, and the laws, according to which the planets revolve. In testimony of the benefit mankind derived from his discoveries, he is represented by painters and sculptors supporting the globe; and the Atlantides his daughters were placed amongst the stars of Heaven. This constellation is called by the Greeks *Pleiades,* and by us Vergiliae.

I have not introduced this subject for the purpose of making a change in the customary acceptance of words, but because it appeared to me expedient that philologists should be made acquainted with the different significations of the terms.

The manner in which the houses of the Greeks and Romans are built, and the proportions observed in the formation of both, having been related, nothing remains but to explain how they may be constructed with solidity, so that they may continue unimpaired for a length of time.

# CHAP. XI.

## OF THE SOLIDITY OF BUILDINGS, AND THEIR SUBSTRUCTURES.

When buildings are reared from the ground, if their foundations be made in the manner already described for the walls and for theatres, they will endure for ages. But if it be necessary to construct vaults below ground, their foundations must be more substantial than the walls of the buildings which are to be built upon them. The walls, pilae and columns of the latter must be placed immediately over those below them; so that solid may bear upon solid: for if walls or columns project beyond the substructure, their duration must necessarily be short.

It will conduce to the strength of a building if posts be placed under lintels, near the pilae and antae; because when lintels and beams are charged with a superincumbent weight, they yield in the middle, and cause fractures in the building. But if posts of this description be placed under them, and forced to their bearings by wedges, the beams will be prevented from yielding to the pressure. Great care must be taken that arches, formed by stones shaped like wedges, the joints of which tend to one centre, be introduced wherever it is necessary to relieve the beams of the superincumbent weight. When arches, constructed in this manner, spring from beyond the ends of lintels or beams, these are neither liable to bend, because the weight no longer presses upon them, nor will injury ensue to the building if they decay, because they may be replaced without difficulty.

When buildings are raised upon piers which are connected by arches formed by wedges, the joints of which tend to one centre, the piers at the ends must be greater than in other places; in order that they may be enabled by their weight to resist the pressure: because when the wedges are acted upon by the weight above them, their tendency to yield exerts itself against the imposts. When therefore the angular piers are sufficiently strong, they retain the wedges in their situations by the resistance they oppose; and thus give firmness to the whole building. It is not of less importance that every part of the structure should be perpendicular to the horizon; nor ought any part to overhang.

The chief attention must, however, be directed to the foundations, to prevent the many evils which arise from the pressure of earth against them; because its pressure is not always uniform, but increases during the winter through the constant absorption of moisture, to which it is not exposed in summer. Hence it has a tendency to thrust out the walls of the substructure. In order to guard against this inconvenience, we must be careful to proportion the thickness of the walls to the quantity of soil in contact with them. At the same time buttresses, or shores, must be constructed, equal in thickness to the walls of the substructures, at distances from each other equal to their height. They should project before the face of the wall at the bottom as much as the thickness of the substructure there, and contract gradually towards the top, where their projection ought to be as much as the thickness which is there given to the walls. Besides these, others should be constructed inwardly to act in a direction opposite the pressure, in form like the teeth of a saw: they ought to project as much as the height of the substructure, and their thickness should be equal to that of the walls. Others also should be built extending in a diagonal direction from wall to wall, at a distance from the angles equal to the height of the substructure; from the middle of which walls should be built uniting them with the angles of the building. The buttresses and diagonal walls will counteract the pressure of the earth against the substructure, by opposing a resistance in an opposite direction.

I have now explained in what manner buildings may be constructed so as to be free from defect; and the measures which ought to be pursued in the first stages of building. It is not necessary to be so circumspect with regard to tiles, tigna and asseres; because whatever proves defective in these may afterwards be replaced without difficulty. I have likewise shewn by what means those foundations which do not appear firm may really be rendered so.

Of the preference to be given to the kind of materials employed, it is not in the power of the architect to determine; because, as I have before observed, the same things are not to be obtained in all countries. Besides which it remains with the proprietor of the building to decide whether it should be constructed of brick, or of rough or hewn stone. The merits of building may be made to appear in three several ways; in the beauty of the execution, in the costliness of the material, and in the general effect of the whole. When the resources of opulence have been lavishly employed, the cost is admired; when the workmanship is excellent, the skill of the artificers is commended; but when an imposing effect is produced by the beauty and symmetry of its parts, it redounds to the fame of the architect. In order to attain this, it behoves us to pay attention to the opinion of artists, and even of the ignorant, because men in general, not architects alone, are judges of what is striking. This difference, however, will always exist between architects and those who are ignorant of the science; these are judges only of what they see executed; those, on the contrary, as soon as the conception is formed, know, before the building is begun, its utility, the propriety of its appearance, and the effect it will produce.

# EXPLANATION OF THE PLATES

TO

# SECTION IV.

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TO

## SECTION IV.

THE sixth book of Vitruvius treats of the domestic architecture of the Greeks and Romans: perhaps there is no part of the work of our author which involves so many difficulties, with such scanty means of surmounting them. Of temples and theatres and other public buildings there are many remains; and whenever difficulties occur in illustrating edifices of this kind, we have various specimens to which reference may be made, with the probability that a consideration of the method observed in constructing them will assist us in throwing light upon the subject. But we are without any authority to which we can refer with the certainty of obtaining a just conception of the arrangement of their dwellings. The descriptions of the villas of Cicero and Pliny abound in terms; but little advantage can be derived from them, inasmuch as they convey no idea of the magnitude, or the relative position of the several parts.

The ravages of time have nearly exterminated all traces of the private habitations of the ancients: and the preservation of those remains of ancient dwellings which have recently been discovered at Pompeii, is owing to an extraordinary convulsion of nature, which hid them for ages from our knowledge. The buildings, however, of a city which makes so inconsiderable a figure in the annals of history, can afford us very little assistance in investigating the prevailing form and disposition of parts in the palaces of the opulent and enlightened citizens of Rome. Under these circumstances, the most we can hope to effect is to give some idea of the general arrangement of the entire house. And even here is so wide a field for conjecture, that we ought not to be surprised if those who have attempted to illustrate the text of Vitruvius on this subject, by presenting us with their own conceptions of the houses of the Romans, have produced plans which are at variance with each other; no one of which seems entitled to be preferred above another.

Most of those who have undertaken to illustrate our author have adopted the idea, that the atrium was part of the house itself: there are however some who suppose it to have been the court before the house, immediately upon entering the vestibulum, corresponding to the aula of the Greek house. With this opinion, for reasons which will be mentioned when this particular subject comes to be discussed, I concur decidedly; and in describing the plan of the Roman houses I shall take it for granted that such was really the case. The mode of arranging the several parts of the house which must necessarily ensue from such a disposition of the atrium, will be found to be different from any hitherto offered.

If the domestic architecture of the Romans be involved in obscurity, how much more impenetrable is the veil which hides from our knowledge that of the Greeks. Vitruvius is the only author who enumerates the different apartments of their houses, and he is by no means diffuse in his account of their general arrangement. To assist us in determining this, we must be permitted to argue synthetically, and to avail ourselves of such light as we have been enabled to throw upon the mode of construction which was adopted in the private habitations of the Romans; convinced as we feel that this, as well as every other subject connected with the arts and sciences, was derived immediately from a Greek original. It will not be denied that, in order to attain a certain degree of knowledge of the prototype, it will be a material assistance if we consider the copy attentively.

The mention of different parts belonging to a Greek residence frequently occurs in the writers of antiquity; but little can be gathered from them which leads to the discovery of the connection subsisting between the several members of the fabric.

As the scene of the latter books of the Odyssey lies almost wholly in the palace of Ulysses, continual mention is made of various parts of it; and by comparing several passages in the poem with the context, some conjecture may be formed of the general disposition which prevailed in the houses of the Greeks during the time of Homer. To this subject we propose returning, when the Greek houses of a later age shall have been considered.

# PLATE I.

## SECTION OF A ROMAN CAVAEDIUM.

The cavaedium was one of the courts of a Roman house, generally surrounded by a covered passage; having the middle area exposed to the air. There was, however, a kind of cavaedium termed testudinatum, in which no part was left open.

The commentators upon Vitruvius have, for the most part, confounded the atrium with the cavaedium; because, in the description of the Tuscan cavaedium, the porticoes are said to be formed by throwing beams across the atrium from its opposite sides. The word atrium, however, can only allude to the court around which the porticoes are constructed; and not the atrium properly so called. But what does away every idea of the identity of the atrium and the cavaedium is the account given by Pliny of his Laurentine villa; in which they are mentioned as distinct courts of the house.

Plate I. is intended to represent the section through the cavaedium, termed by Vitruvius displuviatum, the porticoes of which he tells us were roofed in a different manner from those of other cavaedia. This mode has been explained in various ways: that which is here offered differs from all hitherto given. A slight review of the text will be sufficient to convince us that Vitruvius intended the roof of the porticoes in a cavaedium of this kind, to be inclined towards the walls of the court; for, in the first place, he says that the deliquiae, or rafters which support the gutters, are made to throw back the water which drips from the eaves; that is to say, of the surrounding buildings. Again, the compluvia of the porticoes being *erecta*, or rising from the walls, do not intercept the light from the triclinia. It is evident that by inclining the roof towards the walls, an opportunity would offer itself of giving more light to the rooms around the court, by making the columns of the cavaedium more lofty than when it is made inclining from the walls: supposing the interval between the windows of the upper and lower floor the same in both instances. In the third place, he says that there is a chance of gutters sometimes overflowing, when the roof is constructed in this manner, and thus injuring the walls and the wood-work; which evidently implies that the gutters must have been between the roof of the compluvium and the walls of the surrounding buildings.

The section is supposed to be made across the court transversely. The building which rises above the portico is intended to represent the exterior of the Egyptian oecus; the section of which is shewn in Plate III.

## PLATE II.

### PLAN OF A ROMAN HOUSE.

We have before alluded to the difference of opinion which exists as to the nature of the atrium and cavaedium.

Some authors have contended that the atrium formed part of the house; and that the vestibulum was the court which presented itself on entering from the street: others, on the contrary, make the atrium the great court itself, and the vestibulum the portico immediately in front of the entrance into the court. Although Vitruvius speaks of the vestibulum in general terms, he gives no account of its situation in the houses of the Romans. He mentions the vestibulum amongst those parts of a Greek house which constitute the andronitis; where it seems to mean that part corresponding to the pastas of the gynaeconitis. The word atrium, in its general signification, seems to mean any area comprehended between four walls; and would therefore be equally applicable to the great court of the house, or to any apartment of considerable dimensions, under cover. In this latter sense it is frequently used by the Latin poets. The author of the *Lexicon Antiquitatum Romanarum* has discussed the subject at some length, and is of opinion that the atrium, properly so called, was a great court, surrounded by porticoes, corresponding to the aula of a Greek house. There cannot be any doubt but that such was the atrium of Vitruvius; because the dimensions which he assigns to some are too considerable for any apartment in the habitation of an individual.

The proportions of the atrium were determined in three several ways. In some the width was made three fifths of the length: in others it was two thirds: in others the length was made the diagonal of a square, each of whose sides was equal to the width. The least width, therefore, which an atrium of an hundred feet in length could have, was sixty feet.

On the right and left of the atrium were the alae or wings; which were covered porticoes; within which, sometimes, were the cellae familiaricae, or apartments for domestic purposes. Servius observes upon a passage in Virgil[1], that the culina, or kitchen, was in the atrium; whence he infers that the term was derived; because, on that account, it was *atrum*, black, from the smoke. In these porticoes statues were placed. Each of the alae of an atrium an hundred feet long, would have been twenty-five feet.

The tablinum was entered from the atrium. When the latter was from forty to sixty feet in width, the tablinum was two fifths of it. The tablinum therefore is made twenty-four feet in the plate before us. The mention of the cavaedium succeeds that of the tablinum: the width of its compluvium is directed to be not less than a third nor more than a fourth of the width of the atrium: its length was proportioned to its width in the same manner as the atrium.

The peristyle of the gynaeconitis is directed to be made of greater extent transversely than the width, measured in the direction of the house.

The exedra and bibliotheca are represented, in the plan, under the porticoes of the cavaedium; because, although Vitruvius does not inform us in what division of the house

[1] Aen. I. 726. III. 353.

they were placed, he mentions the cavaedium amongst the parts which the clients and friends of the proprietor were at liberty to enter uninvited: whence it is probable that these, being public apartments, were situated in this court. The triclinia, or common eating rooms, on the contrary, being amongst those parts of the house which could not be approached by any, excepting the persons of the household, unless when expressly invited, are represented in the porticoes of the peristyle.

Besides the triclinia there were grand banqueting rooms, called oeci, for public occasions. Of these one kind was termed Corinthian, another Tetrastyle, a third Egyptian, and a fourth kind Cyzicene. The oecus, in the plan before us, is supposed to be of the latter kind: it has doors in the centre of the ends; and windows in the walls on the right and left, looking upon the gardens; in compliance with the mode of construction described by our author. In the plans usually given of a Roman house, all the several kinds of oeci are introduced: it seems more probable, however, that there was but one large banqueting room in the generality of houses; for, although several varieties are mentioned, it does not follow that they were all to be found in the same palace. We might with equal propriety suppose that the four kinds of cavaedia were several courts of the same house.

Vitruvius is altogether silent upon the use to which the apartments on the upper floor were destined. It is generally allowed that they were almost wholly appropriated to sleeping-rooms and store-chambers. He mentions staircases, but does not point out their situations.

a....Vestibulum.
b....Atrium.
c.c..Alae.
d.d.Cellae familiaricae.
e.e..Courts of the offices.
f.....Tablinum.
g....Cavaedium.
h....Exedra.
i.....Bibliotheca.
k....Cyzicene oecus.
l.l...Gardens.
m...Pinacotheca.
n....Rooms for embroidery.
o.....Peristyle.
p.....Vernal triclinium.
q.....Summer triclinium.
r.....Winter triclinium.
s.....Cold bath.
t......Tepid bath.
v.....Warm bath.
w.w.Sudatories.
x.x..Cubicula.

## PLATE III.

SECTION OF AN EGYPTIAN OECUS.

## PLATE IV.

PLAN OF THE HOUSES OF THE GREEKS.

The Greeks had no atrium, but instead of it was a passage, called thyroreum, by which the peristyle was approached. On the side of the peristyle opposite the entrance was a kind of vestibule called pastas: on the right and left of which were apartments termed severally thalamus and amphithalamus. Beyond these were oeci, or halls of a square form, in which the mistress of the family was accustomed to employ herself and her household in the occupations of spinning and weaving.

In the first peristyle were the triclinia in daily use, and the apartments of the domestics; this division of the house was called gynaeconitis. In the south portico of the greater peristyle, which was termed andronitis, were the Cyzicene oecus and pinacothecae; in the eastern the bibliotheca; in the western the exedra, and in the northern the great oecus, or banqueting room. The hospitalia, consisting of triclinia and sleeping-rooms appropriated to strangers, were situated on the right and left of the great oecus. There were likewise courts or passages attached to the hospitalia, called mesaulae.

| | |
|---|---|
| a.....Thyroreum. | k.k..Square oeci. |
| b.....Stables. | l......Great oecus. |
| c.c...Cellae of the porter. | m.m.Mesaulae. |
| d.d..Courts. | n.n...Apartments for strangers. |
| e.....Peristyle of the gynaeconitis | o......Vestibule. |
| | p.....Great peristyle. |
| f.f...Common triclinia. | q.....Bibliotheca. |
| g.....Pastas, or vestibule. | r.....Exedra. |
| h.....Thalamus. | s.....Cyzicene oecus. |
| i......Amphithalamus. | t.t...Pinacothecae. |

## PLATE V.

### SUPPOSED ICHNOGRAPHY OF THE PALACE OF THE ODYSSEY.

It seems reasonable to suppose that the plan upon which the houses of the Homeric age were generally built, was present to the writer whenever it was necessary to mention any parts of the palace; and not, that the description would accurately apply to the individual habitation of Ulysses: for that degree of precision did not fall within the province of the poet. In fact, it would seem essential that the description should be so general as to be recognized by all to whom the tale might be recited.

This being the case, it is of little importance that the remains of the palace, if any such really exist, cannot be made to accord with the description of Homer. Mr. Gell, in his interesting work upon the geography and antiquities of Ithaca, has described some ruins discovered upon the site, as he imagines, of the dwelling of Ulysses; and shews, with great ingenuity, under what circumstances they may be made to agree with Homer's account of the palace of that chief. We, however, proceeding on the grounds of presumption already stated, shall attempt to prove that the ichnography of Greek houses of a later period coincides in many respects, as to the general disposition of parts, with the plan which may be collected from scattered passages in the Odyssey.

The progress of civilization, whose dawn first taught mankind to construct houses as a shelter from the inclemency of the seasons, in after times enabled them to adapt them to the nature of the climate and the customs of the inhabitants. And although, in the interval between the age of Homer and the date of the houses described by Vitruvius, some change in manners might have taken place, yet they must at that time have been so far established as to render the supposition of any important revolution inadmissible. The continuance of the same climate, and the existence of nearly the same customs, seem to point out the necessity for an adherence to the same principles in building.

Greek houses, according to Vitruvius, appear to have consisted of three divisions; two of them having an open court surrounded by apartments for various purposes. These were the andronitis and gynaeconitis: the intermediate one was termed the oecus quadratus, or banqueting room. In like manner the palace of the Odyssey seems to have had the same number of separate divisions; which were the αὐλὴ and μέγαρα γυναικῶν, corresponding respectively with the andronitis and gynaeconitis; and the μέγαρον, or coenaculum, which, like the great oecus of the Vitruvian palace, appears to have served as the banqueting room of the numerous suitors of Penelope. It is also probable that the prothyrum and prodomus, on opposite sides of the coenaculum, corresponded with the pastas and vestibulum which led to the two courts of the Greek house from the great banqueting room: and in both instances were the only avenues from one to the other. We shall therefore assume this general arrangement, and mention various passages to shew that it is consistent with the description of Homer. If this point can be established, it will sufficiently prove that the general principle, upon which the houses of these different ages were constructed, were alike. And this is all the light that can be expected to be thrown upon the subject; considering what are the means of elucidation left to us.

We shall begin by shewing that the scene of the conflict between Ulysses and the suitors was confined to the μέγαρον, or coenaculum, from whence the only ways of escaping were through the doors leading to the womens apartments, and the prothyrum. The former were closed before the contest began; and the latter was defended by Ulysses and his friends. There were indeed other doors leading to the upper parts of the palace; but they did not admit of the escape of the suitors. One of them led to a window whence the town might have been alarmed; but the position of Ulysses allowed of its being guarded by one person.

Let us take the several parts in the order in which they occur; observing, however, that the chief approach to the houses of the Greeks gave immediate access to the gynaeconitis; whereas that to the palace of the Odyssey appears to have opened into the αὐλή, or andronitis; after the manner of the Romans. In comparing the plans of the two we must therefore reverse the order of the courts.

The first object which presented itself on approaching the palace was the τεῖχος, or wall of the aula[1], in which were the doors leading to the aula, or principal court: these were termed θύραι τῆς αυλῆς. Euryclea is desired by Eumaeus to shut the doors of communication between the coenaculum and the gynaeconitis, whilst Philaetius goes out silently and fastens these doors with a cable, which is kept, for that purpose, under the portico; ὑπ' αἰθούσῃ[2]. The object of this movement seems to have been to prevent succours arriving

[1] XVIII. 101. [2] XXI. 390.

from the town. The aula, or court, was entered through these gates. In this court was an altar of Jupiter, whither Phemius and Medon repair during the slaughter of the suitors[1]. Here the suitors hold their feast in honour of Apollo: the victims are brought to be slain and confined under the portico[2]: not that cattle were usually kept in this court, but in an area in front of the gates[3].

The αἴθουσα was either a portico surrounding the court constructed with columns, corresponding to the peristyle of a Greek house; or, like the simple cavaedium of the Romans, was a certain space around the walls covered with a pent or roof, under which were the thalami of the men[4], after the manner of the later Greeks. There is certainly no mention made of columns, nor of the use to which it was applied: but it must have been roofed over, because the thalami are said to be ὑπ' αἰθούσῃ. subter porticum.

On the side of the aula opposite to the entrance was the prothyrum, corresponding to the παστὰς of the Greek houses described by Vitruvius. It was a vestibule before the coenaculum exposed on one side to the court. It is here that Ulysses and Irus contend; the latter is dragged by the heels from the prothyrum through the aula, and left by Ulysses on the outside reclining against the wall of the aula[5]. Minerva, at the opening of the poem, presents herself before the prothyrum, and is discovered by Telemachus, who is seated, together with the suitors, within the prothyrum; whence he goes and conducts her ἔντοσθεν δόμου[6], within the

[1] XXII. 379.
[2] XX. 189.
[3] XVII. 298.
[4] III. 399.
[5] XVIII. 101.
[6] I. 126.

coenaculum, away from the confusion of the prothyrum; that he might have an opportunity of obtaining some information concerning his father[1].

On another side of the coenaculum was the prodomus, or vestibule of the gynaeconitis. The οὐδὸς, or pavement, of this vestibule is termed λάϊνος, in contradistinction to that of the prothyrum, which is sometimes called μέγας[2], but is more frequently used without any epithet[3]. It appears however to have been of wood[4]. The prodomus must have been in the side opposite to the prothyrum; for Ulysses shoots through the rings from his seat[5], and the arrow flies through the door-way: the position of his seat was manifestly near the door-way of the prodomus; because Telemachus, when he conducts him within the coenaculum, seats him near the stone threshold: ἐντὸς ἐϋσταθεος μεγάρου παρὰ λάϊνον οὐδὸν[6]. It is further evident that the door-way through which the arrow flies was that of the prothyrum; for the doors of the gynaeconitis were shut before the trial took place. The terms which Homer uses to express these door-posts, σταθμοὶ τεγέος, clearly indicate that they were those leading from the gynaeconitis: the word τέγος, according to Eustathius[7], signifying the upper part of the house inhabited by women. Hesychius interprets τέγεοι θάλαμοι, chambers in the upper part of the house. According to Pollux also, τέγος signifies the upper part of the house. This is further evident from many passages of the poem; for women descending from their chambers take their station near these door-posts:

[1] I. 135. [2] XXII. 2. [3] XXII. 127. XVIII. 17. 33. 109. XVII. 413
[4] XVII. 339. [5] XXI. 420. [6] XX. 258. [7] Il. VII. 248.

thus Nausicaa is represented as stationed in the palace of Alcinous, παρὰ σταθμὸν τέγεος. The station of Penelope is described in the same words[1]: when she descends to join the suitors in the coenaculum, she places herself here[2]. After she has visited the armoury, she returns to the same place[3]. Entering through the same door-way after the slaughter of the suitors she passes the stone threshold[4], and seats herself against the wall opposite Ulysses. These passages prove that the door-way, whose situation with regard to the prothyrum has been shewn, was that leading to the gynaeconitis.

Ulysses is represented as sleeping in the prodomus; and near this place must have been the thalamus of Penelope; for from hence he hears her voice lamenting. Penelope also from her thalamus hears what is passing in the coenaculum. The thalamus of the queen might therefore be on one side of the prodomus, and the thalamus of Ulysses on the other; like the thalamus and amphithalamus of a Greek house, which Vitruvius represents as situated on either side the vestibule. On hearing the voice of Penelope, Ulysses rises in haste; and taking with him the couch which had been prepared for him, leaves the fleeces upon a seat within the coenaculum, and carries the ox-hide abroad with him[5].

The general disposition of the palace therefore accords with that of the Greek houses described by Vitruvius. We shall proceed to notice other passages, in which the various parts of the building are mentioned; none of which militate against the arrangement here assumed.

[1] XVI. 415. [2] XVIII. 208. [3] XXI. 64.
[4] XXIII. 88. [5] XX. 97.

In speaking of the coenaculum, Homer generally uses the term μέγαρος; although δῶμα and δόμος are sometimes employed to express the same place. When Telemachus sneezes, the sound echoes, ἀμφὶ δῶμα, around the coenaculum, in which the suitors are sitting. At the beginning of the conflict Ulysses leaps upon the great threshold[1] which is stated to be within the door-way, ἔντοσθε θυράων[2]. This limen was therefore a kind of platform extending into the coenaculum, before the doors, from which there was a descent by steps. It was of considerable extent; for Ulysses and his three assistants are represented as possessing it whilst the suitors were within the coenaculum, ἔντοσθε δόμων[3]. The doors were at this time behind the four combatants; for at the suggestion of Agelaus, six of the suitors throw their javelins at the same instant against Ulysses; no one of which wounds him, but they strike either the door-posts, or the doors themselves; which, from this circumstance, appear to have opened inwardly[4].

The way to the street, which was also common to the orsothyra[5], or window which commanded a view of the town, as well as the door-way of the staircase leading to the thalamus in which the arms had been deposited, could not have been far distant from the door-way of the coenaculum; for, in the beginning of the contest, the care of the first, which is described as being at the end of the limen or threshold, is committed to Eumaeus[6]: and Telemachus,

[1] XXII. 2. [2] XVII. 339. [3] XXII. 204. [4] XXII. 258.

[5] Hesychius defines ὀρσοθύρα thus. πᾶσα θύρα μὴ ἔχουσα τὸν βαθμὸν πρὸς τῇ γῇ, ἀλλ' ἀπέχουσα τοῦ ἐδάφους, οἷον θυρίς. ἢ θύρα, εἰς ὑπερῷον ἀνάγουσα.

[6] XXII. 127.

after going to fetch arms, returns unmolested by the suitors; which he could not have done, had the passage to the thalamus, in which the arms were deposited, been beyond the reach of protection from the triumvirate left engaged in the conflict. The door-way, therefore, conducting to the staircase of the thalamus on one side of the door-way, might have corresponded with that of the staircase leading to the orsothyra on the other.

There must have been another approach to this thalamus, through the rooms adjoining the coenaculum, by which Melanthius went to procure arms for the suitors, not far distant from the womens apartments, and distinct from that by which Telemachus went; for, on perceiving the suitors armed, Ulysses calls out to Telemachus to tell him that this act of treachery is either done by Melanthius or some one in the womens apartments[1]. The way by which he gains access to the room, in which Ulysses and his son had concealed the arms, is described to be ἀνὰ ῥῶγας μεγάροιο, which the scholiast interprets as small door-ways leading to chambers in the upper part of the house. It was probably the same by which the weapons were conveyed, when they were taken down from their station within the coenaculum; for the doors of the womens apartments were closed by order of Telemachus before their removal[2]. The room, in which they were concealed, was in that part of the house formerly appropriated to Ulysses[3].

[1] XXII. 15. [2] XIX. 30.

[3] Melanthius might go to the thalamus of Ulysses above the apartment marked *n.* in the plan, by the staircase *p.* And when Eumaeus went to detect him, he might leave the coenaculum by the door-way leading to the staircase *t.*

The suitors at length retreat towards the end of the coenaculum[1], and Ulysses advances and withdraws his weapons from the bodies of the slain. At this instant the minstrel Phemius is standing with his lyre in his hand near the orsothyra, doubting whether he should not leave the coenaculum, which the advance of Ulysses gave him an opportunity of doing, and retreat to the altar of Jupiter in the court. Ulysses addresses him and the herald Medon, and desires them to withdraw into the aula.

The coenaculum must have been an extensive room adorned with columns; for when Ulysses and Telemachus are conveying the armour into an interior apartment, the latter exclaims that the columns and walls appear to be on fire[2]; and after the slaughter Penelope finds Ulysses placed near a great column[3].

Now that we are upon the subject of the Homeric architecture, it may not be improper to notice a building called tholus, which appears to have been near the walls of the court[4]; the use of which Eustathius has attempted to explain. He says it was a circular room in which the furniture in daily use was kept; such as tables, goblets, and drinking cups. There is not, however, any passage in the Odyssey in which allusion is made to the use of this building, so that the opinion of Eustathius may have been founded upon conjecture only.

From a consideration of its form and situation conjointly, a conjecture may be made of the use which the tholus of

[1] XXII. 270. [2] XIX. 38. [3] XXIII. 90. [4] XXII. 442.

the Odyssey was calculated to answer. The area, in which the building stood, appears to have been allotted to that division of the palace which, in the villa pseudo-urbana of the Romans, was termed rustica; and contained the stables, corn-yards, barns, granaries and other buildings for agricultural purposes[1]. This being its situation, we are next led to consider the use to which its circular form might be best adapted. A knowledge of the customs, noticed in the works of Homer, would at once suggest that it was calculated by its form to serve as a threshing floor. The operation of threshing amongst the ancients was performed by placing the corn in a circular area, and beating out the grain with the hoofs of oxen, which were yoked together and driven over it. This mode is related by Homer himself in the following terms; τριβέμεναι κρῖ λευκὸν ἐϋτροχάλῳ ἐν ἀλωῇ[2]. A similar custom prevails in Greece at this day. Eustathius supposes the word tholus to be derived from θέειν, and ὅλον; equivalent to περιθέομενον, signifying running around. This etymology would apply better to θόλος, considering it as the area, or threshing floor, than in any other point of view. The Roman area was of a circular form, and open on all sides to the wind, as we learn from Varro[3].

The great column of the tholus, mentioned in the Odyssey[4], was probably in the centre, about which the oxen were made to go; and perhaps served to uphold a

[1] Vide Cato de R. R. III. 1. IX. 1. Varro. XIII. 6.

[2] Il. XX. 496. Heyne reads ἐϋκλιμένῃ, for ἐϋτροχάλῳ.

[3] R. R. I. 2. [4] XXII. 466.

conical roof, with which the earliest buildings of a circular form, yet existing in Greece, are found to have been covered. The building in this state would resemble an umbrella; the column, which may be supposed to have passed through the roof[1], being represented by the handle or stick. It is a curious circumstance that the prytaneum at Athens was termed both θόλος and σκιὰς[2]; which latter word signifies an umbrella. If we can imagine a roof of this kind supported on the sides with props placed in the periphery of the area, the whole building will present us with the prototype of that kind of temple called by Vitruvius monopteral; the covering of which he terms tholus. The sepulchre of Porsenna mentioned by Pliny[3] was roofed in a similar manner: the account he gives of it is in the following words, "supra id quadratum pyramides stant quinque, quatuor in angulis, et in medio una, in imo latae pedum septuagenum, ita fastigiatae, ut in summo orbis aeneus et petasus[4] unus omnibus sit impositus."

a.....The gates of the wall.
b....The aula or great court.
c.c..Portico called aithousa.
d.d..Thalami under the portico.
e.....Prothyrum.
f.....Doors of the coenaculum.
g.....The wooden threshold.
h.....Coenaculum.
i......The stone threshold.

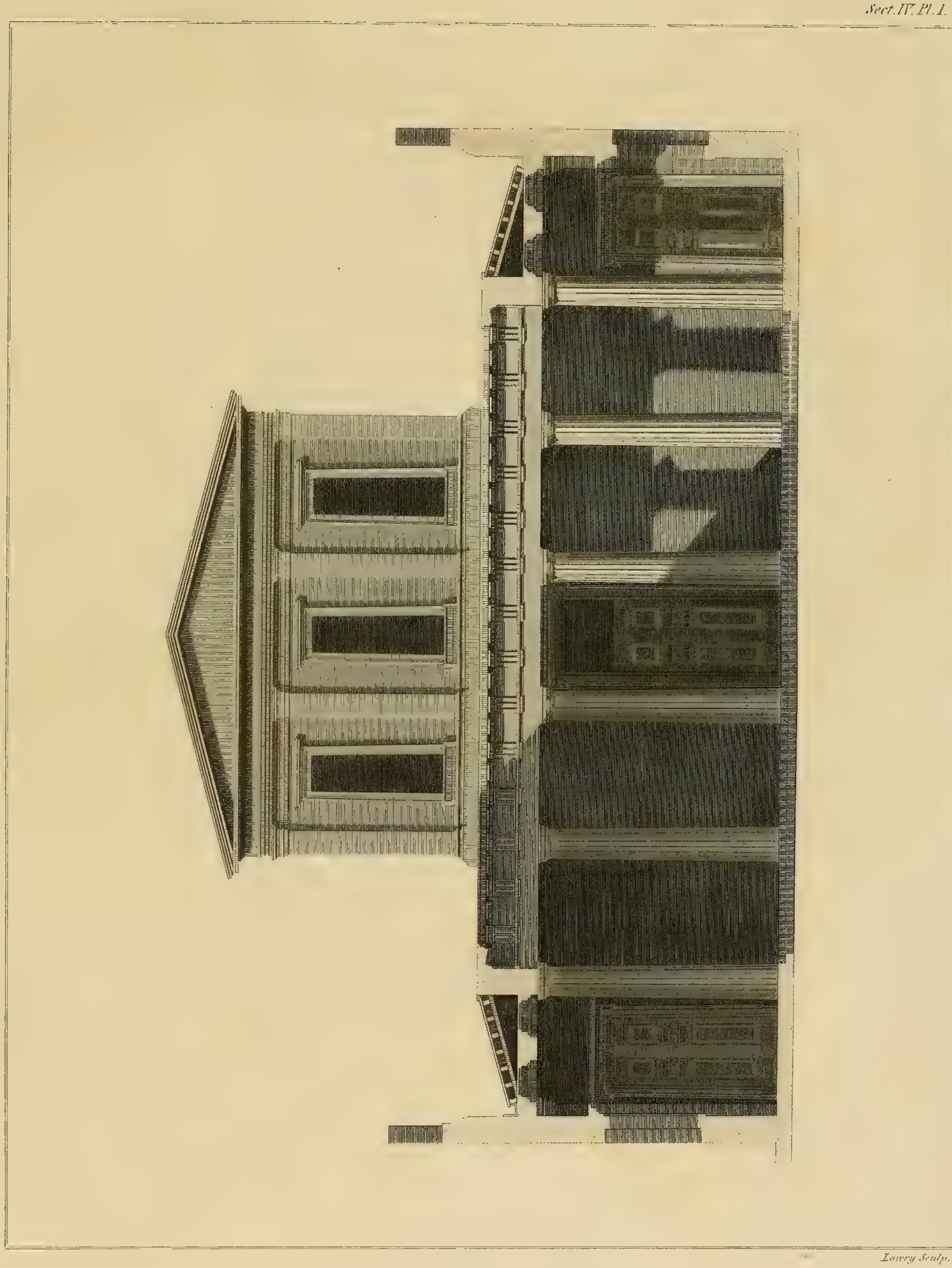
[1] This supposition will explain the manner in which the cable was made to surround the roof after it had been fastened to the great column.

[2] Σημαίνει δὲ καὶ τὸν παρὰ Ἀθηναίοις λεγόμενον θόλον. Suidas in v. Σκιάς.

[3] XXXVI. 13.

[4] The petasus was either a bonnet or umbrella, and was sometimes termed tholia. Schol. in Theocr. Idyl. XV. 38.

k.....Doors of the prodomus.
l.....Apartment, over which was the cubiculum of Penelope.
m...Apartment, over which was the cubiculum of Ulysses.
n.n..Apartments corresponding to the Greek oeci.
o.....Staircase to the thalami of Penelope.
p.....Staircase to the thalami of Ulysses.
q....Thalami of Penelope.
r.....Thalami of Ulysses.
s.....Ascent to the orsothyra.
t.....A staircase corresponding to the last.
v.....Courts corresponding to the hospitalia of a Greek house.
w...Court of the house corresponding to the gynaeconitis of the Greeks.
x.x..Apartments of the domestics.



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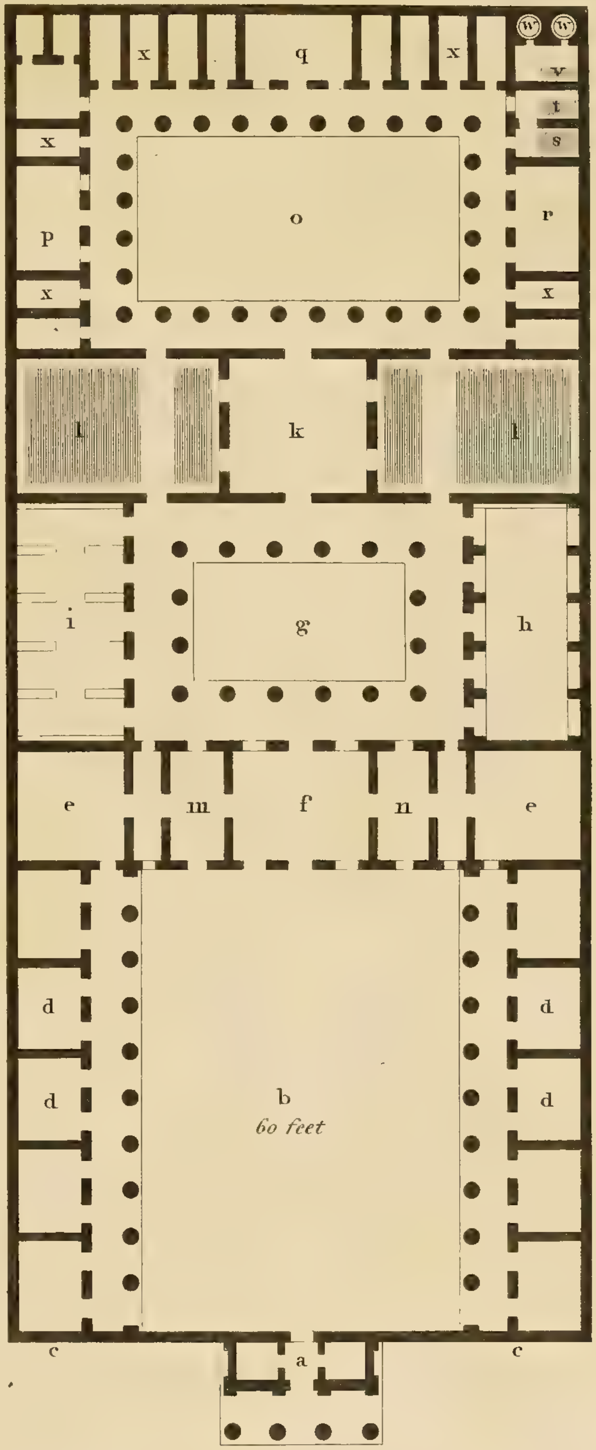


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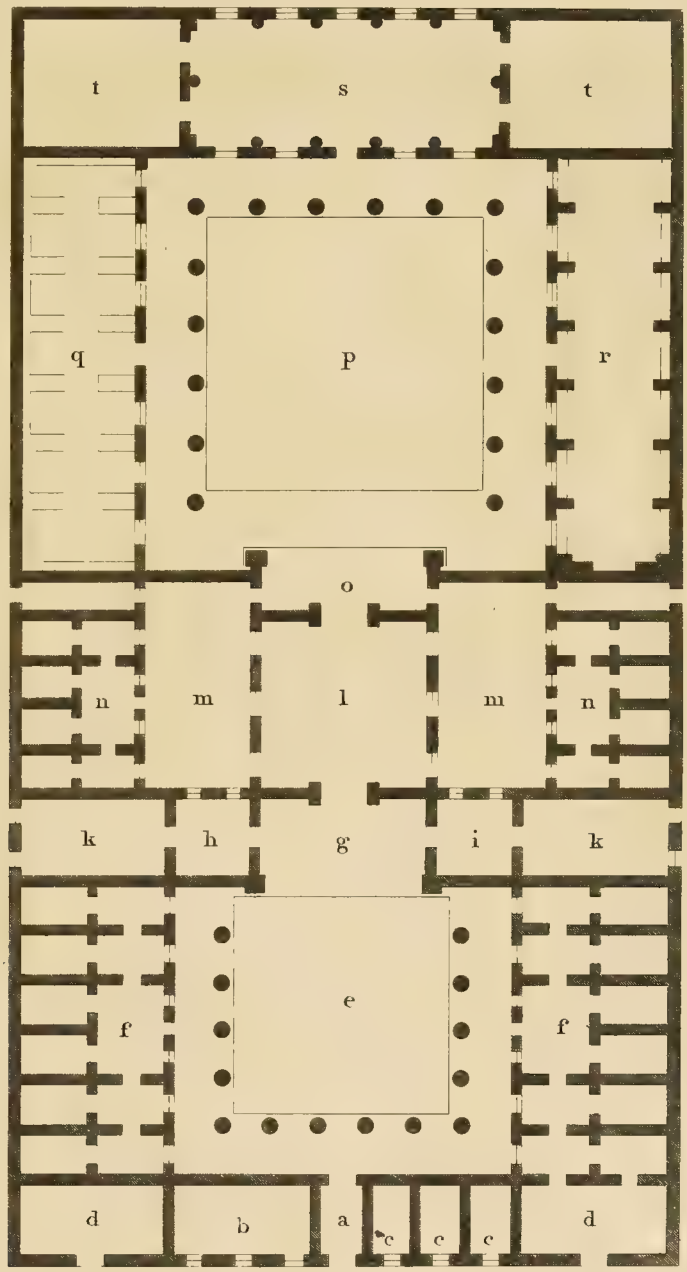


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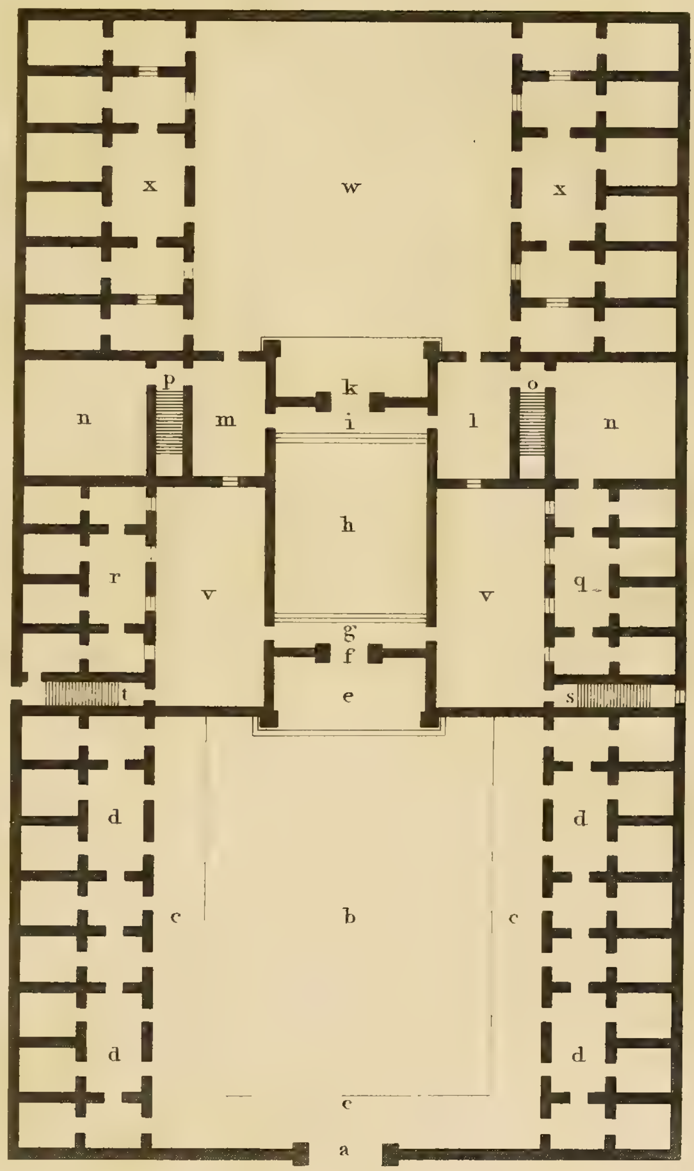


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# GLOSSARY.

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## A.

*Abacus.* The square member upon the capital of Ionic columns. The abacus of Corinthian capitals is not a square figure; the sides, although equal, being curved inwardly. The word abacus is derived from the Greek ἄβαξ, signifying a small table.

*Acroteria.* Small pedestals at the angles and vertex of a pediment. The gate of the Agora at Athens is the only instance in which they appear in Grecian buildings. The Greek word ἀκρωτήριον signifies the extremity, or vertex of any thing, and also a promontory; in which sense the word acroterium is used by Vitruvius. lib. v. c. 12.

*Amphiprostyle.* A temple which has a portico in both fronts. See Prostyle.

*Ancones.* The ornaments depending from the corona of Ionic door-ways, against the antepagments: they were likewise termed prothyrides. The Greek term ἀγκών, from which the Latin ancon is derived, signifies the arm, or bend of the arm. Vitruvius calls the sides of a right-angle triangle, subtending the right-angle, ancones. lib. iii. c. 3.

*Antae.* The square pilasters terminating the walls of a temple. When a temple had no portico in front, two columns were made to intervene between the antae; and the aspect of the temple was said to be in antis. The Greeks called the antae, παραστάδες; and the temple thus constructed, ναὸς ἐν παραστάσιν.

*Antepagmenta.* The three pieces constituting the frame of a door-way: the transverse piece was sometimes called antepagmentum superius, and supercilium. Pegmata has the same meaning. The Greek words for the antepagmenta were, στάθμοι and ϖέγματα: the transverse piece was sometimes distinguished by the term ὑπέρθυρα.

*Apophyge.*
*Apothesis.*
*Apophysis.* The small fascia or band at the top and base of the shaft of columns. The introduction of this member is supposed to have arisen from the use of iron rings, with which trees, the columns of early days, were bound to prevent their splitting. The Greek word ἀποφυγὴ signifies an escape, or remedy.

*Araeostyle.* That species of temple which has its columns placed widely asunder: derived from the Greek words ἀραιός, signifying thinly placed, and στύλος, a column.

*Arcae.* The gutters of the cavaedium. The word arca is used to signify a beam of wood which has a groove, or channel, hollowed in it from one end to the other.

*Asseres.* Small rafters immediately beneath the tiles of a roof.

*Astragal.* A small moulding, whose contour is circular, at the neck of the shafts of columns next the apophysis. It also occurs in the base of Ionic columns, and below the fasciae of the Corinthian epistylium. The Greeks called the dice, or pieces, with which the game of the ϖλινθίον was played, ἀστράγαλοι, because they were commonly formed of the vertebrae, or bones of the neck. If a number of these bones be strung together, they will be found to bear some resemblance to the astragal at the hypotrachelium of Roman columns.

*Atrium.* The court of a Roman house entered immediately from the *fauces* of the vestibulum. The atrium and cavaedium did not differ materially in their construction. Varro makes the atrium the same as the open cavaedium of Vitruvius. De ling. lat. iv. 33. In the description which

Pliny gives of his villa, both the cavaedium and atrium are mentioned.

*Axes.* Those timbers of a roof which form two sides of a triangle, the tignum being the base. These timbers are termed principals by us.

## B.

*Baltei.* The bands in the flanks of Ionic pulvinated capitals. Balteum and balteus were generally used by the Romans to signify the belt by which the sword or quiver was suspended.

*Basilica.* A hall of justice, in which also merchants used to assemble: as in the exchange of modern days. So called from the Greek βασιλικαὶ, scil. στοαὶ, because kings used to sit and hear causes in them, upon a raised stage which was called the tribunal.

## C.

*Caldarium.* The hot bath. The vase which supplied the hot bath was likewise termed caldarium.

*Canterii.* Beams of wood, in the frame-work of a roof, extending from the ridge to the eaves; corresponding to the rafters of a modern roof. The word canterii was also applied to mean two inclining reeds, fixed in the ground some distance asunder, and meeting at the top, for the support of vines.

*Capreoli.* Those pieces in the roof which serve to prop or uphold the axes, or principals. A fork inclined so as to afford support to any thing was likewise termed capreolus.

*Cavaedium.* The court of a Roman house, which was either covered or exposed in part to the air. See Atrium.

*Cella.* The body or principal part of the temple: anciently written cela. It is thought to be derived from celandus, to be concealed, or shut out from public view; because in early temples the cella could only be entered by privileged individuals.

*Chalcidica.* Chambers attached to the basilica; they were built at one end when the situation would admit of it. See Note 1. Sect. iii. c. 1.

*Columbaria.* The holes left in walls for the insertion of pieces of timber; so called from resembling the niches of a pigeon-house. The niches of a mausoleum, made to receive the cineral urns, were likewise termed columbaria.

*Columen.* The term applied to the upright timbers of the roof, which correspond to the modern king-posts.

*Compluvium.* The interval between the roofs of the porticoes which surround the cavaedium. The rain was admitted through this opening and fell upon the area below, which was termed by some authors impluvium.

*Conisterium.* An apartment in the palaestra, in which sand was kept for sprinkling the athletae, after they had been anointed. The word is derived from κονὶς, signifying dust, or sand.

*Corona.* The members constituting the uppermost of the three divisions of the entablature of a portico, or any other building in which columns are introduced. This division is termed cornice by us. See Epistylium.

*Corsa.* See Fascia.

*Coryceum.* Philologists are not determined as to the application of that part of the palaestra which was thus called. Baldus and Barbaro derive the term from κωρύκιον, a small ball; and suppose it to be a room nearly corresponding to our tennis-court.

*Cuneus.* One division of the audience part of a theatre comprehended between two adjoining scalaria, or staircases, which lead from one praecinctio to another: so called from its form, which resembles a wedge. The foremost cunei were termed cavea prima; the middle, cavea media; and the uppermost, cavea summa. The whole of the audience part, exclusive of the orchestra, was likewise called cavea.

*Cymatium.* An undulated moulding, the profile of which resembles the letter *S*. The term is derived from the Greek word κυμάτιον, which signifies a little wave.

## D.

*Decastyle.* A portico consisting of ten columns in front: derived from δέκα, ten, and στύλος, a column.

*Denticulus.* A member in the Ionic and Corinthian entablatures, occurring between the zophorus and corona; and is, properly speaking, part of the latter. So called because it represents denticuli, or small teeth, placed at equal intervals apart.

*Diastyle.* A species of building in which the columns are placed a considerable distance asunder, which, however, is not so great as in the araeostyle. Derived from διὰ, through, and στύλος, a column; because the interval allowed of a free passage between the columns.

*Diathyra.* The vestibule before the doors of a Greek house, corresponding with the prothyra of the Romans. Derived from διὰ, over against, and θύρα, a door-way.

*Diaulon.* The race course, the circuit of which was two stadia, or twelve hundred feet; from whence it was used to signify a measure of two stadia.

*Diazomata.* See Praecinctions.

*Dipteros.* A temple surrounded by a double range of columns. Derived from δὶς and πτερὸν, having two wings or ranges of columns.

## E.

*Echinus.* A member of the Doric capital, so called from its resemblance to the echinus, or large vase, in which drinking cups were washed. The form of the vase might probably be suggested by the echinus marinus, divested of its spines, and placed with the open part upwards.

*Ecphora.* The projection of any member or moulding before the face of the member or moulding next below it. Derived from ἐκφέρειν, to carry forward.

*Entablature.* Those members of a portico which were constructed upon the columns; consisting of the epistylium, zophorus and corona. Vitruvius uses the words ornamenta columnarum to signify these members; and somtimes he includes the three several parts in the term epistylia.

*Entasis.* The swell of the shaft of columns. See note. Sect. ii. c. 2.

*Ephebeum.* An apartment in the palaestra, in which the youth were exercised. It appears to have been a kind of exedra. The Greek word ἔφηβος, from whence it is derived, signifies a youth, or one arrived at years of puberty.

*Episcenium.* A division of the scene of a theatre. The scene sometimes consisted of three divisions made by ranges of columns one above the other. The lower was termed scena, and the others episcenia.

*Epistylium.* The lower of three divisions of the entablature, or superstructure upon the columns of a portico; formed by pieces extending from centre to centre of two adjoining columns. Derived from ἐπὶ, upon, and στύλος, a column.

*Epitithides.* The upper member of the corona surmounting the fastigium of a temple; which was also continued along the flanks. Derived from ἐπιτίθημι, to place over. The Latin term for this member is sima, which is probably derived from the Greek σιμὸς; τα σιμὰ being sometimes put for places difficult of access. It does not appear improbable that the Latin word might be written cyma; derived from the Greek κῦμα, a wave; the profile of the moulding being in the form of the letter *S*, or waved line. The term cymatium, which is applied to a small moulding, whose profile is similar, is evidently derived from κυμάτιον, a diminutive of κῦμα.

*Eustyle.* That species of temple which, from the proportion of the diameter of the columns and their intervals, was thought to possess the greatest beauty. Derived from εὖ, graceful, and στύλος, a column.

*Exedra.* The portico of the Grecian palaestra in which disputations of the learned were held: so called from its containing a number of ἕδραι, or seats. In private houses the exedrae were rooms for conversation; and were generally open, like the pastas, or vestibule, of a Greek house. Pollux makes the exedra and pastas synonymous terms. See note on the word Pastas. Sect. iii. c. 10.

## F.

*Fasciae.* The bands, of which the epistylium of the Ionic and Corinthian orders is composed. The antepagments of Ionic door-ways were likewise divided into three fasciae or corsae. Fasciae were bands, which the Romans were accustomed to bind round the legs. The word corsa was probably derived from κόρση, the temple of the head; which might have given the term to the fillets, or bands, with which the Roman women were accustomed to bind the temples, or head. Amongst the ornaments of the head Pollux mentions the στρόφιον, which was a zone or girdle. lib. iv. 15.

*Fastigium.* The pediment of a portico; so called because it followed the form of the roof, which was made like a triangle; the sides being equally inclined to carry off the water. This part of the portico was termed by the Greeks ἀέτωμα, from ἀετὸς, an eagle; because the outline resembled that of an eagle with its wings extended.

*Femur.* The plane space between the cavities of a triglyph; the word signifies a thigh. The Greek term for this part of the triglyph was μηρὸς, which has the same signification.

*Frigidarium.* The cold bath. The reservoir of cold water in the hypocaustum, or stove room, was termed ahenum frigidarium.

## G.

*Guttae.* Ornaments resembling drops, placed in the epistylium of the Doric order below the triglyphs. They occur likewise in the under face of the mutules in the Doric corona. They are supposed to have originated from the intention to represent drops of water, which, running off the roof, adhered to the under surface of the canterii, or rafters, of early buildings. Vitruvius is silent as to the form which is to be given to the drops; they were sometimes of a cylindrical shape, and sometimes conical.

*Gynaeconitis.* That part of the Greek house to which the women were allowed to have free access. It was also called gynaeceum, from the Greek word γυναικεῖος, appropriated to women. The andronitides were those courts in which were the libraries, picture galleries and banqueting rooms; which the women were forbidden by custom to approach.

## H.

*Hexastyle.* A portico which has six columns in front. Derived from ἕξ, six in number, and στύλος, a column.

*Hospitalia.* The door-ways in the scene of a theatre on the right and left of the valvae regiae, or principal door-way. So called because the moveable scenes, representing inns, or places appropriated for the reception of strangers, were generally placed near them.

*Hypaethral.* A temple whose cella was in part exposed to the air. These temples had a double range of columns within the cella, dividing it into three alae or aisles. The alae on either side were roofed, but that in the middle had no covering. The term is derived from ὕπαιθρος, signifying, open to the sky.

*Hyperthyrum.* That part of the frame of a door-way which was over the supercilium, or transverse antepagment. Derived from ὑπὲρ, above, and θύρα, a door-way.

*Hypocaustum.* The stove-room of a bath in which was placed the praefurnium, or furnace, for heating the caldaria. The term is derived from ὑπο, below, and καίειν, to kindle.

*Hypotrachelium.* That part of the capital of a column which occurs between the shaft and the annulets of the echinus. Derived from ὑπο, below, and τράχηλος, the neck. In the Ionic order the hypotrachelium is no member of the column; but merely means the point of junction between the capital and the shaft.

## I.

*Impages.* The horizontal parts of the frame-work of doors; which with us are termed rails.

*Interpensivae.* Timbers in the roof of the cavaedium; extending in a diagonal direction from the angles, made by the walls of the court, to the angles made by the junction of the beams supporting the roof. They were used to carry colliquiae, or gutters.

## L.

*Laconicum.* A circular stove for the purpose of heating the sudatories, or sweating rooms, of a bath. The use of the dry bath is said to have been prevalent amongst the Lacedemonians. The term is derived from Laconia, the country inhabited by that people.

*Lacunaria.* The ceiling of the ambulatory around the cella of a temple, or of the portico. The beams, which extended from the walls to the entablature, were intersected by others ranged longitudinally: the square spaces made by these intersecting beams were contracted towards the top, and were sometimes closed with single stones, which might occasionally be removed.

*Logeum* and λογεῖον. The pulpitum, or wooden stage, of a theatre placed upon the proscenium, or permanent stage. In the Greek theatre the pulpitum extended into the orchestra beyond the proscenium; and was only used during the recitation of dramatic performances.

*Lysis.* Some member above the corona of a podium; introduced in temples and in the scene of a theatre. Perhaps derived from ἄλυσις, a band.

## M.

*Maeniana.* Seats in the upper porticoes of the forum, from whence the spectators used to behold the shew of gladiators.

The *maeniana* were probably the divisions comprised between two columns of the upper porticoes, corresponding to the boxes of a modern theatre. They were called *maeniana* after Maenius, who, when he sold his house adjoining the forum, is said to have reserved to himself the right of one column, or, more properly speaking, an extent of front from one column to the next adjoining; whence he might view the exhibitions in the forum. There is an inscription given by Marangoni in his *Dissertatione delle memoire sacre e profane del Anfiteatro Flavio*, published in Rome 1746: in which the word *menianum* occurs three times. It there means the several ranges of seats.

*Mesaulae.* The middle courts of a Greek house; situated between the courts of the andronitis and gynaeconitis.

*Metoche.* The intervals between two denticuli in the Ionic entablature. The Greek word μετοχὴ signifies the act of partaking in common with others; which meaning seems to have no reference to the interval between the denticuli. Perhaps ὀχὸς, which signifies a stay, may be allowed to apply to the asseres, or rafters of a roof; the projecting ends of which the denticuli may be said to represent. See Metopae.

*Metopae.* The spaces between two triglyphs in the Doric entablature. Derived from μετὰ, between, and ὀπὴ, the cubilia, or places upon which the beams rest.

*Monopteral.* A temple which has no cella, but consists of columns disposed in the form of a circle, covered with a conical roof. Derived from μόνον, only, and πτερὸν, a wing, or range of columns.

*Monotriglyph.* The interval observed between the columns of a Doric portico, when a space was left sufficient for the insertion of one triglyph only, between those immediately over two contiguous columns. Derived from μόνος, one, and τρίγλυφος.

*Mutules.* Ornaments in the Doric corona placed over every triglyph and over the centre of each of the metopae. In the under surface there are eighteen guttae, or drops, arranged in three rows.

## O.

*Octostylos.* A portico which has eight columns in front. Derived from ὀκτὼ, eight, and στύλος, a column.

*Odeum.* A small theatre for the recitation of musical compositions: generally in the neighbourhood of the theatre. The odeum at Athens was contiguous to the theatre of Bacchus. The odeum at Pompeii also adjoins the theatre.

*Oecus.* The banqueting room of a Roman house. There were several kinds of oeci; viz. Corinthian, Tetrastyle, Cyzicene, and Egyptian. In the Greek house the oeci were spacious apartments, in which the mistress of the family employed herself and servants at the loom. The word is derived from the Greek οἶκος, which was generally used to signify the whole house.

*Opae.* The cubilia, or beds, of the beams of a roof. See Metopae.

*Orchestra.* The area of the theatre comprised between the lower range of seats and the proscenium. In the Roman theatre the orchestra was appropriated to the senators; but in the theatres of the Greeks the orchestra was the scene of action of the dancers, who were termed ὄρχησται, or ὀρχηστηρες; whence the term ὀρχήστρα is derived.

## P.

*Palaestra.* A building amongst the Greeks; appropriated to the rehearsal and exhibition of gymnastic sports. Derived from πάλη, the exercise of wrestling.

*Paradromides.* Hypaethral walks attached to the Greek palaestra. The Romans called these walls xysta: whereas the xysta of the Greeks were covered porticoes, in which the athletae used to exercise in winter. The term is derived from παρὰ, near, and δρόμος, the course.

*Parastatae.* Square columns, or antae; called also *parastades* and *parastaticae.* Vitruvius uses the term to signify the square posts placed behind the columns of the basilica for the support of the floors of the upper porticoes.

*Periacti.* The revolving scenes of the theatre, called by the Romans *scenae versatiles.* They were placed before the *itinera versurarum,* or those entrances to the stage which were in the returns of the permanent scene; the term is derived from the Greek περιάγειν, to revolve.

*Peripteral.* A temple which had its cella surrounded by columns. Derived from περὶ, around, and πτερὸν, a wing, or range of columns.

*Peristyle.* A portico which surrounds an open court. It also signifies the porticoes surrounding a temple.

*Pilae.* Square blocks placed upon the epistylia, immediately over the columns in basilicae; for supporting the timbers of the roof. Pilae were also buttresses built against the walls of a mole, to resist the force of the water.

*Pinacotheca.* The picture gallery of a Roman palace: derived from the Greek πίναξ, a picture, and θήκη, a repository.

*Plinth.* The square footing below the bases of Ionic and Corinthian columns. In Grecian architecture plinths do not appear to have been employed, the bases of the columns resting upon the upper step of the building. The Latin word plinthus is derived from the Greek πλίνθος, which signifies a tile.

*Pluteus.* The wall which was sometimes made use of to close the intervals between the columns of a building; and was either of stone, or some material less durable. The latter method was adopted only in places under cover, whence that kind of building was called *opus intestinum*. The pluteus was also a kind of podium intervening between any two orders of columns placed one above the other. The word is used in this sense in the descriptions of the basilica and the scene of the theatre. The pluteus has been adopted between every two orders of columns in the exterior of all the theatres and amphitheatres of the Romans which are known to us.

*Podium.* The raised stylobate of a temple; consisting of a plinth, base, die, corona and lysis; which were continued without interruption around three sides of the building. The podium was also adopted in the scenes of theatres; and here, instead of being uninterrupted, it was frequently broken round the bases of the columns; and formed what are commonly called pedestals.

*Praecinctiones.* The passages or corridores which separated the several ranges of seats in the Roman theatre. They are likewise termed *baltei*, or belts. These divisions were termed διαζώματα by the Greeks.

*Pronaos.* The area immediately before the ναὸς, or temple itself. It is often put for the portico in front of the building. The posticus in one front corresponded to the pronaos in the other: in some temples the cella was approached through both. The generality of Grecian temples had two approaches.

*Proscenium.* The area in front of the scene of the theatre, which was seen when the pulpitum was removed: when, it is probable, the temporary scenes were taken away, in order to exhibit the front of the permanent scene.

*Prostyle.* A temple which has a portico in one front, consisting of insulated columns with their entablature and fastigium. Derived from πρὸ, before, and στύλος, a column. When the temple had a portico in both fronts it was termed amphiprostyle, or prostyle in all fronts; from ἀμφὶ, on all sides, and προστύλος.

*Prothyrides.* See Ancones.

*Prothyrum.* See Diathyra.

*Pseudodipteral.* A temple which has a single range of columns in the flanks at the same distance from the walls of the cella as although the temple had been dipteral. Derived from ψεύδω, to deceive, and δίπτερος.

*Pteroma.* The spaces between the walls of the cella of a temple and the columns of the peristyle: called also *ambulatio.* Derived from πτερὸν, which word was applied to signify a range of columns.

*Pulpitum.* The wooden stage of the theatre, upon which the mimic, as well as dramatic, exhibitions of the Romans were represented. In the Greek theatre the pulpitum was used only by the *histriones*, or performers in the drama; and was probably removed before the amusements of the orchestra were exhibited.

*Pycnostyle.* A species of temple in which the diameter of the columns was great in proportion to the intervals. Derived from πυκνὸς, dense, or thick, and στύλος.

## Q.

*Quadrae.* The bands or fillets of the Ionic base: between which the scotia, or hollow, occurs. The *quadra* also means the plinth, or lower member, of the podium.

*Quadrifores.* Folding doors whose height was divided into two. Folding doors which opened in one height were termed *fores valvatae*, or *valvae*. Vitruvius directs the door-ways to be made wider when these were used: and the height to be increased when the folding doors were divided in height. The *bifores* of Vitruvius were two single doors. See the note upon the *fores valvatae*, Sect. 11. c. 6.

## R.

*Regula.* A band below the taenia of the Doric epistylium, extending the width of the triglyph; and having six guttae depending from it. It also signifies the space between two adjoining canals of the triglyphs. The words femur and μηρὸς have the same signification.

*Replum.* The pannel of the impages, or horizontal rails, of a framed door. See the explanation of Plate ix. Sect. 11.

## S.

*Scamillus.* A small plinth below the bases of Ionic and Corinthian columns. See the explanation of Plate v. Sect. 1.

*Scena.* The permanent architectural front which faced the audience part of the theatre. It sometimes consisted of three several ranges of columns one above the other.

*Schola.* The margin or platform surrounding the bath. It was occupied by those who waited until the bath was cleared. The schola was also a portico, corresponding to the exedra of the Greek palaestra, and was intended for the accommodation of the learned, who were accustomed to assemble and converse there.

*Scotia.* The hollow moulding in the bases of Ionic columns. Derived from the Greek word σκότιος, signifying shady; because, from being hollow, part of it is always in shadow. The scotia is likewise a groove or channel cut in the projecting angle of the Doric corona. The Greeks termed the scotia of the base τρόχιλον, which signifies the groove in a wheel or pulley.

*Sima.* See Epitithides.

*Stadium.* Part of a Greek palaestra. Its plan was similar to that of the Roman circus. The athletae used to be exercised in the stadium; which was provided with seats rising one above the other for the accommodation of spectators.

*Stylobate.* / *Stereobate.* The substructure of a temple below the columns; sometimes formed of three steps, which were continued around the peristyle; and sometimes of walls raised to a considerable height; in which case it was approached by a flight of steps at one end.

*Supercilium.* The transverse antepagment of a door-way. The word is also used to denote the small fillets, or bands, above and below the scotia of the Ionic base.

*Systyle.* That species of temple in which the proportion of the intervals to the diameter of the columns was greater than in the pycnostyle.

## T.

*Tablinum.* An apartment of a Roman house which was entered immediately from the atrium. In this room records were preserved in cases; and the hereditary statues were placed.

*Taenia.* The band or fillet surmounting the Doric epistylium.

*Templa.* Certain timbers introduced in the roofs of temples: they were placed upon the canterii, or principal rafters, extending the whole length of the temple from one fastigium to the other. They correspond in situation and use with our purlins.

*Tetrants.* The four equal parts into which the area of a circle is divided by two diameters drawn at right angles to each other.

*Tetrastyle.* A portico consisting of four columns. A cavaedium was called tetrastyle when the beams of the compluvium were supported by columns placed over against the four angles of the court.

*Tholus.* An appellation given to all buildings of a circular form. Vitruvius uses it to signify the roof of a circular building. IV. 7. VII. 5. Suidas says the building at Athens, where the Prytanes used to assemble, was termed θόλος, on account of its circular form. A circular building at Epidauria was likewise termed θόλος. The laconicum of a bath was also called θόλος, and is described as being of a circular form. The word θολία was also used to signify the bonnet or petasus. In the fifteenth Idyllium of Theocritus, Praxinoe demands her cloak and θολία, which either meant an umbrella or bonnet. The scholiast upon the passage informs us that the petasus and umbrella were both named θολία, from their resemblance to the θόλος. Pollux informs us that the θολία was a plaited shade, which women were accustomed to use before umbrellas were invented. VII. 23. 4.

*Thyroma.* The doors of a temple or house. The term sometimes signifies not only the doors themselves but every thing connected with them, whether stone or wood. Derived from θύρα, a door-way.

*Thyroreum.* A passage in the houses of the Greeks; at one end of which was the entrance from abroad, and at the other the door-way leading to the peristyle. Derived from θύρα, a door-way, and οὖρος, a keeper; because on one side of the passage were the apartments of the porter.

*Tigna.* The principal timbers of a roof extending across the temple: in contradistinction to the *trabes*, which were timbers placed upon the columns or walls in the same direction with them. The tigna correspond to our tye-beams.

*Torus.* The convex member of the Tuscan and Ionic bases. In the Attic base there is both an upper and lower torus.

*Transtra.* Horizontal timbers in the roof of a building. The term is applied to the transverse beams of a galley which extend from side to side and connect the ribs, in the same manner as these horizontal pieces connect the axes, or principals, of a roof.

*Triclinium.* The eating room of a Roman house, so called from the Greek word κλίνη, signifying a couch; because in general it contained three couches, upon which the ancients used to recline at their meals. It is also applied to the couches themselves.

*Triglyph.* An ornament above the epistylium in a Doric entablature, placed over every column; with sometimes one in the interval between so placed, and sometimes more. The word is derived from the Greek γλυφὶς, an incision or channel, of which there were three in this ornament.

*Trochilus.* See Scotia.

*Tympanum.* The triangular pannel of the fastigium of any building, comprehended between its corona and that of the entablature. The pannels of a framed door were likewise called tympana.

## V.

*Vestibulum.* Part of the andronitis of a Greek house; similar, probably, to the *prostas* of the first peristyle or court. The *vestibulum* also means the portico in front of a Roman house.

*Volute.* An ornament of the Ionic capital, in form like a spiral. The introduction of volutes is said by Vitruvius to have arisen from an imitation of the mode in which women were formerly accustomed to ornament their hair. But they are thought, with greater probability, to have represented the horns of the Ammonian Jupiter. In early days the statues of the heathen deities were merely blocks; which, as the arts progressively advanced, were rounded into columns, and afterwards a representation of the human head was sculptured upon them; so that they resembled the termini of later ages. Small volutes occur in the capitals of Corinthian columns; they are said to be in imitation of the spiral tendrils in the stalk of the acanthus; which plant first suggested the introduction of leaves in the capitals of columns.

## X.

*Xystus.* See Paradromides.

## Z.

*Zophorus.* The centre of the three divisions of the entablature over Ionic and Corinthian columns; having the epistylium below and the corona above it. The word is derived from the Greek ζώοφορον, which is compounded of ζώον, an animal, and φέρω, to bear: because the representation of animals and men were frequently sculptured in this member. With us it is termed frize.

THE END.

T. DAVISON, LOMBARD-STREET, WHITEFRIARS,
LONDON.